1993

The impact of a cognitive strategy on students' composing skills

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Order Number 9326230

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Moye, Macon Jasper, Ed.D.

The College of William and Mary, 1993

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Ann Arbor, MI 48106

THE IMPACT OF A COGNITIVE STRATEGY ON STUDENTS' COMPOSING SKILLS

A Dissertation

Presented to

The Faculty of the School of Education

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

By

Macon J. Moye

May, 1993

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ON STUDENTS COMPOSING SKILLS

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This work

is dedicated to Glenn H. and Jean Moye Shepard

whose support, encouragement, and love

were there when I needed them most.

This work is also dedicated

to the memory of my friend,

Dr. Janet Coleman Kimbrough,

whose kindness, wise counsel, and stimulating discussions

are deeply missed.

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Acknowledgments

This research project was completed with the assistance and cooperation of many people to whom I wish to express my appreciation. My grateful appreciation is extended to the members of my dissertation committee, Dr. George M. Bass and Dr. Mark G. Gulesian, for their support and assistance in the completion of this study. Special appreciation and sincerest thanks are given to Dr. Robert J. Hanny, chair of my committee, not only for assistance in this project but for guidance and inspiration throughout my graduate studies. Dr. Hanny's depth of knowledge about and keen interest in curriculum and instruction are infectious and have served to stimulate me to move beyond my narrow biases and explore more fully all aspects of teaching and learning.

Thanks are also expressed to Dorothy Fink, Jean Lowe, Dr. Walter Gant, and Dr. Judith Whittemore for their professional and personal mentorship. Ray and Evelyn Moye are especially thanked for providing refuge and friendship throughout the writing of this study. Special recognition is given to Dr. Katherine Rodgers, my friend, colleague, and collaborator whose ideas, thoughts, and words of encouragement kept me on track.

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ABSTRACT

The purpose of this study was to evaluate the effectiveness of the Cognitive Process of Instruction (CPOI), a cognitive strategy approach to writing instruction. An important emphasis of the CPOI approach was a strategy designed help students build a conceptual framework for the main idea paragraph as a means of improving composing skill.

The sample included 121 fifth grade elementary school students. Intact classes were assigned to the treatment or comparison group. The nonequivalent comparison-group design was used, and data were examined using analysis of covariance. The dependent variable was composing skill as measured by holistic and domain scoring. One null hypothesis was tested to determine whether differences between the experimental and comparison groups were significant at the .05 level of confidence.

The data analysis found that students in the cognitive strategy

treatment showed significant difference when compared to comparison group students who were exposed to a modified writing process approach. However, this difference was in a different direction than predicted. Students in the cognitive strategy treatment experienced a decrease in composing score while students in the comparison treatments improved in composing skill. Length of treatment time and cognitive overload were seen as the most plausible explanation.

Recommendations include additional research to determine effect of length of time of treatment on (1) length of composition, (2) number of paragraphs written, and (3) composing skill for low, average, and high achieving students.

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THE IMPACT OF A COGNITIVE STRATEGY ON STUDENTS' COMPOSING SKILLS

Chapter 1

Introduction

Justification for the Study

Research in written composition is a relatively recent phenomenon considering the long history of America's emphasis on the 3 R's. Prior to the mid 1970's, formal efforts toward teaching writing were very limited:

> Compared to mathematics, for instance, where there is a great deal of explaining, demonstrating, and teaching of rules, very little direct instruction goes on in the teaching of writing. . . All of this has suggested to some that writing belongs to the category of things that can be 'learned but not taught' (Scardamalia & Bereiter, 1986, p. 794.).

Scardamalia and Bereiter (1986) suggested that such an attitude toward the instruction of writing partially explained why, in 1974, there were no sessions at the American Educational Research Association's annual meeting presenting research on writing. However, by the time of the 1979 annual meeting there were sixteen such sessions. Why the sudden increase in interest?

In part, the rapid increase in interest can be attributed to public attention to what has become known as the "writing crisis". The writing crisis was precipitated in part by an influential Newsweek article (December 8, 1975) titled, "Why Johnny Can't Write". As a result of the public and academic discussions which followed, several interesting and significant points came to light.

Shaughnessy, (1977) found that speakers of nonstandard dialects experienced the greatest writing difficulties. Lyons (1976), found that university students did not perform as well in writing as would be expected. Berlin (1987) recounted that entering college freshmen had historically demonstrated poor writing skills. Perhaps most disturbing, data from the National Assessment of Educational Progress (1975, 1980a, 1980b, 1980c) demonstrated declines in writing proficiency across the period 1969-1979.

While the decline cited in the National Assessment of Educational Progress (NAEP) was not severe, the magnitude of dissatisfaction with writing competence was amplified by a rise in expectations. Scardamalia and Bereiter (1984) explained that increasing numbers of low-income and minority students enrolled in college and expected to enter middle-class occupations as a result of gaining a college education. Competence with written language

would be crucial for the low-income, minority student to compete for jobs. Additionally, growth in information processing careers rather than manufacturing jobs demanded greater facility with communication skills -- oral and written.

The writing crisis did not come as a surprise to some researchers or practitioners. Nearly ten years before the Newsweek article, Applebee (1966) had documented in the National Study of High School English Programs: A Record of English Teaching Today that very little writing was done in schools. Muller (1967) found that of the writing which was done, much was concentrated around gaining competency in mechanical skills and lower level composing abilities. According to Scardamalia and Bereiter (1984), shortly after the Newsweek article was published, the book, The Torchlighters Revisited, pinpointed the cause of the crisis; most teachers from elementary school through university were ill-prepared to teach writing.

The Bay Area Writing Project (BAWP), a collaborative effort between the University of California - Berkeley and the public schools of the San Francisco Bay Area, had begun to address the cause of poor writing instruction at least a year before the press proclaimed the existence of a writing crisis. James Gray, one of the

original founders of BAWP had maintained from the project's earliest day that student writing was weak because no one had been paying any attention to writing. He believed most teachers at all levels lacked training and know-how to teach writing, and the results of research and of effective teaching practices in writing were not being transmitted to the vast majority of the nation's teachers. Thus, he asserted the only way to cause massive change in student writing was to work directly with classroom teachers. The BAWP approach was to improve writing instruction through summer institutes that focused on a process approach to writing. The institutes were designed so that teachers who teach writing could share their knowledge, engage the research base on composition, and experience successful writing themselves. These teachers would form a growing cadre of "fellows" who would continue to influence the knowledge and practice of other teachers concerned with improving students' writing abilities (Gray & Myers, 1978; Neill, 1982; Silberman, 1989).

According to Fadiman and Howard (1979), Neill (1982), and Nelms, (1979), the BAWP soon broadened into the National Writing Project (NWP). This project was well received because it: (1) tackled the known shortcomings of writing instruction in a direct and positive

manner; and, (2) sought to improve writing instruction by increasing teachers' own interest and competence in writing and to acquaint them with the best of available teaching activities. In addition, the NWP was comprehensive and focused on wholesale instructional improvement of writing. Thus, the NWP received and continues to receive widespread endorsement.

How effective has this response been in addressing the writing crisis? According to the most recent data, the response thus far has been minimally effective. According to the National Association of Educational Progress (NAEP) 1990 report, The Writing Report Card, 1984-88, in the fourteen year span between 1974 and 1988, practically no gains were made in students' writing performance:

> In summary, looking across the three grade levels and the different types of writing tasks given in the assessments, one finds that many students have difficulty communicating effectively in writing. No more than 47 percent of the students at any grade level wrote adequate or better responses to the informative tasks, and no more than 36 percent of the students wrote adequate or better responses to the persuasive tasks. Although performance was somewhat better on the narrative writing tasks, no more

than 56 percent of the students wrote adequate or better responses. (National Assessment of Educational Progress 1990 - *Accelerating Academic Achievement: A Summary of Findings from 20 Years of NAEP*, p.18)

Certainly, the process approach advocated by the Bay Area Writing Project made valuable contributions toward improving students' writing skills. The BAWP provided a systematic approach to addressing a complex human task -- writing. It also has been an enthusiastic means of increasing the amount and type of writing done in classrooms by students and adults alike (Neill, 1982). However, according to Langer and Applebee (1987), recent reports have indicated that process-oriented approaches to writing instruction have been relatively ineffective in helping students to think and write more clearly. Applebee, Langer, and Mullis (1986), suggest the problem may be in the superficial manner in which the process strategies are being taught. They claim students are not learning to link process activities with problems they face in their own writing. These findings combined with continued poor results cited by the most recent NAEP (1990) report and The Writing Report Card, 1984-88 (1990) have caused educators and researchers to ask if there are other instructional approaches, strategies, techniques

or methods to improve students' writing.

While acknowledging the efforts of the Bay Area Writing Project's approach to improve writing instruction, Marlene Scardamalia and Carl Bereiter (1986), in a review of research on written composition, noted that recent cognitive science investigations had produced a number of models which provided a more comprehensive and useful understanding of the composing process. In this review, Scardamalia and Bereiter referred to strategy instruction as a new educationally relevant focus for research on writing.

In general, the use of methods and concepts of cognitive psychology focuses on the question of what goes on in the mind as people learn. Specifically, cognitive strategy instruction views learning as an active process that occurs within the learner and which can be influenced by the learner:

> There are two different kinds of activities that influence the encoding process while the learner is learning: (1) teaching strategies, such as the teacher presenting certain material at a certain time in a certain way; and (2) learning strategies, such as the learner actively organizing or elaborating or predicting about the presented material (Weinstein and Mayer,

1986, p. 315).

Pressley, Symons, Snyder, and Cariglia-Bull (1989), found that, "A number of studies are available on a few fairly simple cognitive strategies such as rehearsal and categorization approaches for list learning and associative elaboration, but research on more complex strategies is generally less programmatic and less complete" (p.16). Other recent studies have demonstrated that more complex cognitive strategy instruction has resulted in increased student achievement in a variety of curriculum subject areas (e.g., Short & Ryan 1984; Sherrod, 1986; Hopkins, 1987; Deshler & Schumaker, 1986, 1988; Bednarczyk & Harris, 1989).

Anderson (1982), an early proponent of investigating cognitive strategies as a means to improve learning in general, stated that a major challenge for modern writing research should be to discover teachable principles that are valid and that students can use to improve writing performance. Englert and Raphael (in press) have developed an expository writing program, Cognitive Strategy Instruction in Writing Program (CSIW). The CSIW curriculum is being implemented by teachers in eight schools with handicapped and regular education students. The program is still in the process of being analyzed. However, Englert and Raphael, report tentative

positive results on both students' writing performance and metacognitive knowledge as evidence the program is promising.

Graham and Harris (1989), reported that recent studies using a cognitive-behavioral framework to improve writing performance through strategy instruction have produced evidence which demonstrated that this approach holds great promise. Although their investigation has focused primarily on handicapped students, they believe other inefficient learners can be improved by teaching them to make independent use of appropriate strategies and self-management routines. They concluded that, "Taken as a whole, the available evidence indicates that cognitive-modification is a viable approach to written language instruction" (p. 274).

Pendarvis and Howley (1988), reported extraordinary success in improving students' reading achievement through The Cognitive Teaching Project. The Cognitive Teaching Project was designed by Fulton of the Developmental Skills Institute, Richmond, Virginia. The project involved application of cognitive strategies in reading and math instruction. While the program seemed to be especially effective with low-achievers in math and reading, no research is currently available on its effect on students' writing achievement.

Statement of the Problem

The purpose of this study was to evaluate the effectiveness of cognitive strategy instruction designed to increase informational writing skill in elementary school students. The central question this study sought to answer was: What is the effect of the cognitive strategy instruction delivered through the CPOI approach on the composing skill in fifth grade students?

General Hypothesis and Research Question

One research question was addressed:

1. What are the differences in composing skills, as measured by domain scoring, between students using the composing strategy, Main Idea Paragraph Pattern, taught through the Cognitive Process of Instruction (CPOI) approach, and students taught through a modified writing process approach?

Hypothesis

The hypothesis tested in this study was:

Fifth grade students completing a three week, fifteen hour instruction module on using the composing strategy, Main Idea Paragraph Pattern as taught through the CPOI will show significantly higher composing scores, as measured by domain scoring, on writing samples than students completing an

equivalent module taught through the modified writing process approach.

Definition of Terms

The following terms are used in the study:

1. Mode of Instruction. Mode of Instruction refers to the role assumed by the classroom teacher, the kinds and order of activities present, and the specificity and clarity of objectives and learning tasks. Mode of instruction is contrasted with "focus of instruction", which refers to the dominant content of instruction, e.g., the study of model compositions, the use by students of structured feedback sheets, sentence combining, and so forth.
2. Environmental Mode of Instruction. The environmental mode places teacher and student roles in balance, with the teacher planning activities and selecting materials through which students interact with each other to generate ideas and learn identifiable writing skills. This mode of instruction is characterized by (1) clear and specific objectives; (2) materials and problems selected to engage students with each other in specifiable processes important to some particular aspect of writing; and (3) activities,

such as small-group problem-centered discussions conducive to high levels of peer interaction concerning specific tasks. Teachers in this mode are likely to minimize lecture and teacher-led discussion. Rather; they structure activities so that, while teachers may provide brief introductory lectures, students work on particular tasks in small groups before proceeding to similar tasks independently. Although principles are taught, they are not simply announced and illustrated. The concrete tasks of the environmental mode make objectives operationally clear by engaging students in their pursuit through structured tasks.

3. Focus of Instruction. Foci of instruction include types of content or activities which teachers of composition expect to have a salutary effect on writing. These include the study of traditional grammar, work with mechanics, the study of model compositions to identify features of good writing, sentence combining, inquiry, and free writing. These share the supposition that they precede writing and prepare for it or occur early in the writing process (e.g., free writing).

4. Models - Focus of Instruction. "Models" requires students to read and analyze examples of excellent writings in order to recognize and imitate their features.
5. Scales - Focus of Instruction. "Scales" require students to use a set of criteria embodied in an actual scale or a set of questions for application to pieces of writings. Students apply the criteria to their own writing, to that of their peers, to writings supplied by the teacher, or to some combination of these.
6. Composing Process. For the purposes of this investigation, the composing process will be defined according to the model developed by Hayes and Flower. According to this model, the main parts of the composing process are planning, translating, and reviewing. The heart of planning is generating ideas. These ideas are edited and arranged to create a plan that controls the process of actual text production. Some of the generated ideas, however, are ideas of goals to be pursued, and these are stored for later use throughout the composing process. The model claims to account for the large diversity of mental events during composition on the basis of a small number of subprocesses. This is accomplished by a control structure that

allows virtually any subprocess to incorporate any other subprocess. Thus, the whole planning process may be called up in the service of editing, or the reviewing process may be called up for purposes of arriving at an organizing decision. This property of the model, called "recursion", sets this model apart from most linear step-by-step models of composition (op. cit. Scardamalia & Bereiter, 1986).

7. Composing Domain. For the purposes of this investigation, the composing domain is defined as one of five writing subskills (composing, style, sentence formation, usage, and mechanics) or domains which will be measured by holistic scoring. Here, composing refers to the writer's ability to specify and focus on a central idea, to provide elaboration of the central idea, and to deliver the central idea and its elaboration through organized, unified, and coherent discourse.
8. Writing Process. Although there are many variations most current definitions of the writing process include four stages a writer goes through to produce a written product: pre-writing; revising; and post-writing (Neill,1982).
9. The Cognitive Process of Instruction (CPOI). The Cognitive Process of Instruction is a seven step instructional process

that integrates academic content and four learning conditions; stored knowledge, large units of information, cognitive processes, and thinking strategies. A key feature of the CPOI is the use of concept construction strategies utilizing visual learning mediators.

10. Cognitive strategy - Main Idea Paragraph Pattern. This strategy employs two graphic organizers which a writer uses as mediators to generate and organize information before and during the composition of informative writings. This strategy gives the writer a visual representation to be used to organize the descriptive information in a logical and coherent manner. This strategy also provides the writer with a visual checklist of the essential attributes which must be present in the written product.
11. Paragraph Writing Strategy with Information Finder - This strategy is a seven step graphic organizer which a writer uses as mediators to plan, gather information for, and write a main idea paragraph.

Design of the Study

The design of this study was a nonequivalent comparison-group, a variation of the nonequivalent control-group design. In this study

all groups received some type of treatment. The hypothesis in this study was tested by comparing the composing skill scores of students before and after a fifteen day intervention in which the experimental treatment groups received instruction in using a specific cognitive strategy approach, the Cognitive Process of Instruction (CPOI), and the comparison treatment groups received instruction in a modification of their conventional classroom approach to writing instruction.

The sample for this study consisted of 121 fifth grade elementary school students at two predominantly white, middle class schools in the same county located in southeast Virginia. Intact classes were assigned to the treatment or comparison groups.

Pre- and posttests assessed students' writing skills and were administered one day prior to and one day after the 15 day intervention period, respectively. Students' pre- and posttests writing samples were scored holistically and analyzed in five domains by Data Recognition Corporation. The composing domain subscore was used as a measure of composing skill. The resulting data were analyzed through analysis of covariance (ANCOVA).

Limitations of the Study

Composing is among the most complex of all human mental activities (Flower & Hayes, 1980). Experts in the field of writing disagree on exactly what it means to compose and it is generally agreed that writing lacks a unifying theory of composing (Gregg & Steinberg, 1980, & McClelland & Donovan, 1985). In addition, considerable evidence exists to suggest that writers vary in their ability to write in and across different modes of discourse (Braddock et al., 1963, Humes, 1983, NAEP, 1980a, 1980b, 1980c, etc.). This study examines students' composing skill as measured on informational writing tasks in the expository mode of discourse. Therefore, generalization of results are limited to informational writing in the expository mode. Likewise, the geographic limitation of selecting the sample from only one school system suggests that the findings not be generalized to other school systems without careful study to determine if sufficient demographic similarities exist to make such a generalization.

A second caution on generalizing the results of this study is influenced by research that demonstrates writing differs greatly according to age level (Odell, Cooper, & Courts, 1978). For example, Veal and Tillman (1971) examined the written work of second,

fourth, and sixth graders in four modes of discourse: narration, description, exposition, and argumentation. They found that second and fourth grade papers were rated at about the same level of quality, regardless of mode, but the level of rated quality for sixth grade papers far outdistanced the rated quality of papers in the lower grades, regardless of mode. They also found that the slower rate of increasing quality for the argumentative mode relative to the faster rate of increasing quality for the expository mode raised the question whether quality within mode could be improved by specific instruction or whether quality is more dependent on the development of logical thought. Therefore, it is conceivable that research on writing done at one age level may not generalize to writing done at some other age level.

A third limitation in this study concerns the definition of composing skill, the specific aspect of writing investigated. Students' pre- and posttest writing samples were scored in five domains: composing, style, sentence formation, usage, and mechanics. However, since only the composing skill was investigated, only the composing domain score was included in analysis of results. For the purposes of this study composing skill was defined as the students' ability to *specify and focus on a*

central idea, provide elaboration of the central idea, and deliver the central idea and its elaboration through organized, unified, and coherent discourse. Any generalization of results of this study should be compatible with the parameters of this definition.

The final limitation has to do with the three week intervention time frame. There is not consensus among researchers regarding a minimum duration time an experiment should be conducted in order to validate the study's results. Some experts argue that setting a minimum length for the experiment treatment is critically important and that any educator would consider four weeks as a minimum (Slavin, 1989). Other researchers, such as Hillocks (1986), have concluded that duration time is not a factor when assessing the effects studies have had on experiments on written composition. Nevertheless, generalizations regarding the results of the current study should include recognition that the intervention occurred one hour per day for fifteen consecutive days.

Chapter 2

Review of the Literature

Introduction

Chapter Two is divided into four sections: a historical and theoretical overview of writing; a review of the research on effective writing instruction; an overview of cognitive strategy instruction; and, a description of the development of the Cognitive Process of Instruction (CPOI).

Although writing is a commonplace occurrence and nearly everyone does it, the actual act of composing is among the most complex of all human mental activities (Flower & Hayes, 1980). To complicate matters, the experts in the field do not even agree on exactly what it means to compose. Richard Braddock et al. (1962), were some of the first to examine research that might delineate quantifiable measures of teaching that produced good writing. Others, such as Elbow (1973) have stated that writing is more like an art that "can be learned but not taught" (xi). The purpose of this first section is to provide a historical and theoretical context for understanding the origin of writing and the influences which have shaped current research on composing.

The second part of Chapter Two is a review of research on effective writing instruction. This section describes two aspects of teaching writing: How instruction is presented to students and the content focus of that instruction. Research on these two dimensions is reviewed through a series of studies on effective interventions in teaching writing.

The third section of Chapter Two provides an overview of cognitive strategy instruction. This section examines the literature on the origins and attributes of cognitive instruction, schema theory, and the application of strategy instruction to writing.

The final section of Chapter Two describes a specific cognitive strategy, the Cognitive Process of Instruction (CPOI), developed Fulton. This section traces the origin, development and theoretical foundations of CPOI.

Historical and Theoretical Overview

Modern composition theory, research, and practice have their roots in classical Aristotelian rhetoric. In fact, McClelland and Donovan (1985), noted that, "The impact of classical rhetoric on writing theory and instruction has been pervasive across the centuries, and it remains so today. . ." (p. 33).

According to Langer and Allington (1992), three distinct

movements influenced the development of writing in America between the eighteenth century and the 1930's: "(1) classical rhetoric. . . (2) belles-lettres rhetoric. . . and (3) experience-based training in the democratic process, based on Dewey" (p. 688). Russell (1991) asserted that before the 1870's, writing was "ancillary to speaking" (p. 3). According to Russell, college graduates prior to the last quarter of the nineteenth century assumed leadership roles which placed them in "the pulpit, the senate, and the bar" (p. 4), professions that relied much more on speaking than writing. "Correct" writing was an ordinary function of being raised in upperclass society and learning to speak a gentleman's "correct" English. Susan Miller (1989) argued that writing was so embedded in the day-to-day orally based practices of the upperclass that it was largely a matter of reproducing on paper what would otherwise have been spoken and therefore required little or no instruction beyond the elementary school. Thus, until the last quarter of the nineteenth century, writing instruction was a function of higher education and amounted to essentially training in handwriting (Russell, 1991).

Berlin (1984) and Connors (1988) studied writing instruction in eighteenth-century American colleges and found that, during that

period, colleges imitated their English counterparts by emphasizing Aristotelian rhetoric. Berlin stated that the 2500 year old tradition of Aristotelian rhetoric or classical rhetoric, as it became known during the Middle Ages, was elitist, conservative and oriented toward the educated few. This conservatism was partly responsible for the dominance of classical rhetoric from the Middle Ages through the eighteenth century. Classical rhetoric formed the core of what became an essentially aristocratic educational tradition in Europe. Berlin noted that the classical rhetoricians were concerned with both the form and the process of composition, although their focus was with oratory rather than on written products. In classical rhetoric, development of a composed piece or "composition", occurred through the mechanisms of invention, arrangement, style, memory, and delivery. Invention, arrangement, and style later became important elements in theories of written composition.

Berlin (1984) stated that classical rhetoric in American colleges was replaced along with English rule and other elitist traditions. Americans in the late eighteenth and early nineteenth centuries rejected the traditional philosophical orientation of their English heritage. In its place they embraced Scottish Common Sense Realism, a perspective for viewing the world that proved more

compatible with American economic, religious, and aesthetic experiences. By the early 1830's, according to Berlin, a new eighteenth century rhetoric, resulting in part from the rhetorical treatises of George Campbell, Hugh Blair, and Richard Whately, had replaced classical rhetoric as the predominant way of thinking about reality and man's place in the world. The "new rhetoric" was embraced by Americans because it was more compatible with American literary theory of the mid-eighteenth century and it included traditional Protestant doctrine without imposing dogma. Berlin noted that the new rhetoric provided a more flexible orientation that was supportive of a developing democratic culture.

Connors (1988) reported that colleges around the turn of the eighteenth century tended to be small and often religion-based, an arrangement conservative in nature and congruent with propagating classical rhetoric. However, he concluded that colleges began to slowly change, in part because of the influence of the new rhetoric.

Berlin (1984) asserted that the new rhetoric was influential for two reasons: (1) it allowed a more scientific orientation to learning; and, (2) it supported a more liberal, vivid and less artificial manner of understanding how people interacted. In *Philosophy of Rhetoric*, published in 1776, Campbell promoted

emotional appeal and style as the central unit of persuasion rather than Aristotelian logic and invention. According to Berlin and Larsen (1983), Campbell contributed to the evolution of rhetoric by shifting attention of rhetoric away from invention, which emphasized the *discovery* of the available means of persuasion, towards style, which emphasized *managing and shaping* the message. Campbell described rhetoric as "the grand art of communication, not of ideas only, but of sentiments, passions, dispositions, and purposes" (Larsen, 1983, p. 299). Campbell defined four purposes or "ends of speaking": to enlighten understanding, to please the imagination, to move the passions, and to influence the will. Connors (1988) described Campbell's four ends as the predecessors of the four modes of discourse which later became know as narration, description, exposition, and argument. According to Connors, these four modes would dominate the teaching of writing from the end of the nineteenth century through the mid-1950's.

Berlin (1984), observed that Campbell's shift of emphasis away from the process of discovery to crafting an end product was furthered through the contributions of Hugh Blair and his treatise, *Lectures on Rhetoric and Belles Lettres* , published in 1783. Berlin (1984) noted that while Campbell's focus was mostly on persuasive

oral discourse, Blair included an emphasis on the forms of written discourse. Blair focused on the principles of literary taste as evidenced by a variety of forms. Principles of literary taste were derived by studying and analyzing a wide variety of authors and genre (epistle, romance, treatise, dialog, history, reviews, editorials, allegories, parables, letters, essays, biographies, fiction, etc.). Blair's basic assumption was that effective writing is learned through reading and studying examples of effective writing. Connors (1988) stated that Blair's work consolidated the new rhetoric and anchored composition's emphasis on the written product. Larsen, (1983) likewise reported that while Blair believed spoken language was superior for forcefulness in persuasion, the written message permitted readers to have the "written characters before their eyes, where they can arrest the sense of the writer" (p. 301). Thus, the written product was especially valued because it provided a means of visualizing mental operations. Connors (1988) stated that from a pedagogical perspective, it was important to note that learning to write was viewed as a function of reading others' texts to discover proper form (e.g., mental operations) and copying that form rather than learning to generate writing as a means of discovering or creating one's own form.

Berlin (1984), credited Richard Whately and his book,*Elements of Rhetoric*, published in 1828, with contributing substantially to the adoption of the new rhetoric by American higher education. Berlin stated that Whately's book was commonly used in colleges along with Blair and Campbell to teach composition and was meant to be a composition textbook stressing the practical nature of the new rhetoric. Berlin related Whately's description of how the composing process was to be taught in the classroom. Whately's starting point was to assist the student in finding a subject for a theme. After finding the subject, the student was to state the proposition clearly and in a suitable form. It was important that the thesis be focused and coherent; outlining was encouraged. The student then was to develop the thesis into an informal essay exercising correctness in the use of language. Finally, Whately advised that the student would improve "[I]f the teacher will, after pointing out any faults in the learner's exercise, and making him alter or re-write it, if necessary, then put before him a composition on the same subject written by *himself*, or by some approved writer" (Berlin, 1984, p.30). Berlin noted that Whately's plan for teaching composing is the one still found most commonly in today's composition textbooks, some 150 years after its presentation.

Berlin concluded that a significant result of the continuing adaptions and refinement to the new rhetoric was that writing, rather that speaking, became the predominant medium for "composing" at the college level. Berlin concluded that although the new rhetoric originally included speaking as its major component, by the third quarter of the nineteenth century its main concern was writing. In colleges and universities the writing course had become a staple of the curriculum. It was a requirement for all students during the sophomore, junior, and senior years. Composition and writing had become synonymous.

Berlin (1984) described the romantic movement as another significant influence on the evolution of written composition. The romantics, represented by such figures as Emerson and Thoreau, were concerned with the individual discovering reality through experience and the resulting interpretation of that experience. To the romantics, dialog between speaker and audience or writer and audience, was critical to an individual interpretation of reality. This placed writing and speaking at the center of knowing. The romantic movement's influence eventually manifested at the end of the nineteenth century in the philosophies of John Dewey and Fred Newton Scott.

Rudolph noted that a major shift in educational theory occurred after the Civil War (Berlin, 1984). Classical studies which focused on training of the mind were gradually abandoned in favor of a more functional scientific oriented curriculum. As the industrial revolution accelerated and populations in cities continued to increase, public education became more concerned with educating all citizens. Business and industry called for education to emphasize more practical preparation. Job preparation in a rapidly growing economy become a primary goal.

Connors (1988) found that during the post Civil War period, the structure of higher education changed dramatically from mostly smaller private colleges to larger institutions. Connors noted that as the new college and university curriculum became more varied and science-oriented, the study of rhetoric also changed. Rhetoric was transformed from the new rhetoric of Campbell and Blair to what Berlin (1984) called current-traditional rhetoric. While the new rhetoric featured a traditional analysis of argument, eloquence, style, and taste, current-traditional rhetoric was a discipline much more concerned with forms which had practical application. Connors concluded that American culture was calling for a new sort of educated man, and the "Freshmen English Course" as it is known

today, with its emphasis on error-free writing and the ability to follow directions, was born during this period. Discourse form had been an important component of the new rhetoric. However, discourse form changed during the final years of the nineteenth century from the concrete, form-based belletristic model to the more adaptable four modes of narration, description, exposition, and argument as popularized by Bain (Connors, 1988).

Gere (1985), stated that the transformation from the classical to the modern curriculum was led by Harvard's president, Charles W. Eliot. Eliot's 1869 inaugural address criticized "the prevailing neglect of the systematic study of the English language" (p. 111). Although the rest of the university curriculum was shifting toward the German system of electives, Eliot kept written composition central to the new elective curriculum by adding a composition component to the Harvard entrance requirements and by requiring all freshmen to take an English course. Gere further noted that during the next twenty years, at Harvard and other colleges and universities, enrollments continued to increase as the economy expanded and the needs of business and industry grew. The ability to write effectively was one of the skills that all agreed was essential to success. However, the teaching of writing was a cost-inefficient

system when compared with other undergraduate courses because of the large amount of time professors had to spend reading and correcting written compositions. Numerous attempts intended to keep the costs of writing instruction down were unsuccessful and swelling enrollments caused the problem to increase.

Gere found that Harvard and other institutions were diverting substantial amounts of funds to help incoming freshmen bring their writing skills up to college standards. In 1891, faced with growing numbers of students with substandard writing skills, Harvard University appointed a committee of three representatives from outside the college to study the problem and make recommendations. The investigative concerns of the Committee on Composition, while couched in pedagogical terms, were actually administrative in nature: "(1) How can we make composition instruction more cost effective? (2) How can writing instruction keep pace with expanding enrollments? (3) How can we relieve college instructors of the burden of composition instruction?" (McClelland & Donovan, 1985, p. 112). The Committee's report concluded that college freshmen were not prepared for the demands of college writing. The Committee recommended that college entrance requirements in writing be increased and that high schools assume greater

responsibility for writing instruction. Further, they emphasized the need for writing to focus on the mechanics of spelling, grammar, usage, and handwriting.

Gere concluded that the types of questions asked and answered by the Committee on Composition played a critical role in shaping future research on composition by suggesting four priorities:

> (1) written products, not processes of writing, deserve scrutiny, (2) formal aspects of writing are more important than rhetorical ones, (3) composition instruction (and therefore composition research) should be the province of elementary and secondary schools, not colleges and universities, (4) the problems of writing instructors, not the problems of student writers, deserve attention (Gere, 1988, p.113).

Not only did this report dismiss writing instruction as a worthwhile endeavor at Harvard, but as Kitzhaber (1953) discovered, the Committee on Composition's recommendations and two subsequent Harvard Reports in 1895 and 1897 had widespread and largely negative effects on writing instruction at colleges across the country. Kitzhaber (1953) found that many other colleges and universities followed Harvard's lead and adopted entrance exams

that stressed mechanical correctness in composition skills. This led to the establishment of a measurement mania regarding students' writings. The evaluation of compositions by rating scales and error check lists further emphasized mechanical aspects over substance.

By 1900, the composing process was a narrowly focused exercise in college classrooms. Objectivity was the goal, and interpretation was to be avoided. Composing was seen as finding the right language to capture observed phenomena (Berlin, 1984).

In 1892, the National Education Association (NEA) sponsored a study of public education in America. The study was conducted by ten leading educators who were known as "The Committee of Ten" (Langer and Allington,1992). The Committee of Ten, chaired by Harvard's Eliot, met to explore establishing uniformity in school programs and college admissions. While the Report of the Committee of Ten, supported the goals of the Harvard Reports, it recommended a student-centered approach and rejected many traditional practices. The goals from the report called for " 'language and composition, and formal and systematic grammar' . . . as part of the focus on English curriculum at the elementary and high school levels" (p. 689). However, the report also called for

language, composition, and grammar to be taught in conjunction with students' first-hand writing experiences, rather than in isolation. Further the report discouraged mechanical drills in grammar and language. Berlin (1984), stated that these recommendations were particularly influential to the development of writing in the high school because they came at a time when the English course and the first widely established curriculum in writing were being institutionalized at the high school level. Although the Committee of Ten Report called for a child-centered approach, Langer and Allington (1992) concluded:

> By the beginning of the 20th century, writing instruction had taken on a concern with mechanical correctness, as well as a legacy of emphasis on the forms of classical rhetoric. Taken together these reports were to influence the writing curriculum at the college and high school levels for at least the next 50 years (p. 689).

Until the beginning of the 20th century, the theories that gave rise to curriculum in writing focused primarily on form and presentation, and the pedagogical approaches that were based on these views have had a continuing effect on writing curriculum. However, according to Berlin (1987), three major approaches to the

teaching of writing appeared between 1900 and 1920. The oldest, current-traditional rhetoric, originated at Harvard. This approach evolved from the need to provide the new middle-class professionals with a practical utilitarian approach to writing. The second approach was the rhetoric of liberal culture, advanced at such schools as Yale, Princeton, and Williams. This rhetoric was elitist and aristocratic, asserting that the purposes of writing instruction in the English department should be to encourage those few students who possessed genius. All others were to learn writing through courses about literature. This orientation toward writing instruction was derived from the belletristic tradition. The third major approach to writing instruction emphasized writing as training for participation in the democratic process. This represented a rhetoric of "public discourse". This view was reflected in the progressive education movement and had its greatest influence in the high school English curricula of this period.

By the early 20th century the experientially driven, student-centered views of John Dewey challenged the text-based theories (Langer & Allington 1992). "Dewey's student-centered view and ideas of experiential education leading to self-development and societal and economic progress" (p. 690), became known as the the

Progressive Education Movement. Yates (1983) reported that Dewey hoped to reform education by making it more useful and by giving students an active role in their own learning. Berlin (1987), described progressive education as an attempt to apply science to the education of young people. Berlin further stated that progressive education challenged the school to serve the well-being of society, while at the same time, ensuring the development of the individual. According to Berlin, achieving these two aims often led progressive education to contradictory positions between 1920 and 1940. Progressive education was most influential at the elementary and high school levels, although there are some indications Dewey's work had some influence in the colleges, as well (Berlin, 1987).

Fred Newton Scott was a colleague of John Dewey at the University of Michigan, and it is likely they influenced each other in the development of an experience-based pedagogy. In *English Composition as a Mode of Behavior*, written in 1922, Scott discussed the approach to curriculum he had used in his own textbook writing since the turn of the century. He advocated a curriculum based on the social experiences of the student and one which allowed for self-expression.

In *The Teaching of English in the Elementary and Secondary*

Schools, written in 1903, Carpenter, Baker, and Scott, defined a developmental curriculum based on their views that everyday spoken language is the means by which an individual develops intellect. Accordingly, effective written expression was mostly a matter of intellectual skill and knowledge. Thus, writing depended on knowledge of vocabulary and knowledge of the grammar of language. These aspects, they believed, could be learned independent of the study of literature. According to Berlin (1987), Carpenter, Baker, and Scott were among the first writing theorists to address the curriculum for the elementary as well as higher grades. In doing so, they suggested that the writing curriculum in the elementary grades needed to focus primarily on the acquisition and expression of ideas, and somewhat less on the facts and principles of language that underlie successful expression. They called for attention to the meaning of the text as a whole and to the process of writing. They also stressed teaching writing in the total school curriculum.

Yates (1983) reported that under the influence of progressive education, many schools developed interdisciplinary, project-oriented experienced-based curricula. Community interest was encouraged and alternatives to traditional academic courses were offered. In English and other subject-matter classrooms, students

were encouraged to pursue their own interests, broaden their experiences, analyze and solve problems, and use writing and reading as the means to learning rather than as the ends of learning.

According to Langer and Allington (1992), there was evidence of tension between the advocates of current-traditional rhetoric and progressive education. This tension resulted in two conflicting pedagogies by practitioners. While teachers often voiced support for practices representative of the progressive movement, there were contradictive findings regarding implementation of those practices. There was some evidence that progressive orientations focused on students' experiences, with writing topics originating ". . . from personal experience, literature, current events, recreational interests, and the life of the school. . . " (p. 693). However, Langer and Allington concluded that by the end of the 1930's ". . . the essential focus on developing the thought underlying the student's message, and the role of instruction in supporting its development, seems not to have survived (if it had ever been embraced in practice at all)" (p. 694).

Berlin (1987) also found that the tension between traditional and progressive approaches to curriculum and texts waxed and waned throughout the 1920's and 1930's. Berlin noted that various social,

economic, political, and historical events exercised considerable influence during this period and alternately promoted aspects of one approach over the other. While some studies indicated progressive approaches had been implemented (Berlin, 1984; Cuban, 1984; Russell, 1991), other studies by Vose in 1925 and Smith in 1933, found no lasting effects of progressive instruction. Experimentations with progressive approaches had been discarded or abandoned, for the most part, by the end of the 1930's (Langer & Allington, 1992). Yates (1983) likewise found that progressive education gradually fell out of favor because many educators, parents, and students felt it lacked intellectual rigor.

Langer and Allington (1992) described the 1940's as a time of increased attention to democratic ideals and citizenship training. During this period "writing was seen as a tool for communication and social development. Increased enrollments and compulsory attendance laws fanned interest in the education of students of varying abilities and cultural and linguistic origins " (p. 699). The Great Depression and the threats to democracy posed by fascism generated another push for broader, general education requirements just prior to World War II. After the war, these programs increased substantially. The essential feature of most general education

programs during this period was the "communications" course. This course combined writing instruction with lessons in speaking, reading, and listening. According to Berlin, the communications course profoundly influenced the nature of college writing instruction during the ensuing years.

Langer and Allington (1992) described the 1940's through the 1960's, as a period when "theoretical concerns focused on writing as a process of active understanding, and the student was seen as an active language learner -- one who set rules and gained conceptual understanding through firsthand experience" (p. 700). This perspective was compatible with an emerging emphasis on learning writing skills based on a better understanding of oral language. During this period, interest in communications and language usage increased. In 1940, the National Council of Teachers of English (NCTE) funded a study by Charles Fries on grammatical structures and social differences curriculum to benefit traditionally underachieving minority learners. Fries' book, *American English Grammar*, published in 1940, insisted on the social basis of language and the need for English teachers to consider the importance of class and political contexts in teaching writing (Berlin, 1987).

Berlin (1987) reported that during the years between 1940 and 1970, a new field know as structural linguistics also developed. The underlying assumptions of structural linguistics were that language was a social activity which originated from the interaction of human beings and language was a signaling system that could be described in mathematical terms. Warfel (1959), noted that some proponents of the structural linguistics movement even predicted that this new field had unlocked the secrets of language and provided the key to revolutionalizing composition. Berlin (1987) concluded that while such claims were overly ambitious, structural linguistics had a significant impact on the development of rhetoric, composition theory, and writing practice. According to Strong (1985), the impact of structural linguistics is still recognized today in the work on sentence combining by John Mellon, Frank O'Hare and others.

During the decades of the 1940's and 1950's, public schools were criticized for a lack of rigor in the curriculum taught (Berlin, 1987). The launching of Sputnik in 1957 added credence to the criticism. Berlin reported that the space race initiated by the launching of Sputnik had a dramatic effect on American education, beginning with the passage of the National Defense Education Act in 1958. While

this law initially addressed math and science instruction, by 1964 it had expanded to include the study of literature, language, and composition. This marked the first time in American history that federal funds were invested in the teaching of these subjects.

According to Berlin (1987) the Woods Hole Conference of 1959, sponsored by the National Academy of Sciences, initiated an approach to learning which would influence the teaching of writing as well as other curricular areas for the next forty years. The original purpose of the Woods Hole Conference, in light of the launching of Sputnik, was to examine the quality of science instruction in schools. However, under the chairmanship of Jerome Bruner, math, history and literature instruction were reviewed as well. Bruner, a Harvard psychologist, published *The Process of Education*, published in 1960, as the final report of the Woods Hole Conference. In *The Process of Education*, Bruner outlined his ideas on learning and cognition and their relationship to the structure of a discipline. In doing so, Bruner introduced the language of cognitive psychology and the influence of Piaget's developmental perspective to education circles (Berlin, 1987). According to Bruner (1960), learning was to be thought of as a "process", much like in progressive education, except Bruner emphasized a different

conceptualization of process. To Bruner the learning process was contingent upon two conditions: (1) The cognitive level of the student; and (2) the student's cognitive level relative to the structure of the academic discipline being studied. A special feature of process learning, according to Bruner, was the role of inquiry and discovery. Bruner stressed that students needed to engage in writing activities in order to learn models and forms (structures). Bruner said that as students engaged in the process of writing, under the guidance of a teacher, they would "discover" for themselves the structure of the discipline. Berlin (1987) asserted that Bruner's theory on process learning had two significant effects. In the near term educational practices reflected Bruner's emphasis on the structure underlying each discipline. Ten years later, educational practices reflected his emphasis on process-oriented discovery learning.

Langer and Allington (1992) noted that the 1960's marked a shift in writing theory away from the needs of the student and toward the structure of subject matter. This shift resulted in a renewed interest in the structure of the written product. *Research in Written Composition*, by Braddock, Lloyd-Jones and Schoer (1962), set the tone for much of writing research for the next ten years.

Burnham (1984) cited the Braddock, et al., study as an attempt to establish a "scientifically based" coherent theoretical and methodological identity for the discipline of writing. Cooper and Odell (1978) and Gere (1985) criticized the Braddock, et al., study on the grounds it incorporated only research which met a narrow definition of writing; one which focused on structural components rather than process components.

Burnham (1984) stated that while empirical-oriented researchers were at work, another group began voicing dissatisfaction with the restrictive nature of this paradigm. This dissatisfaction crystallized in 1978 with the publication of *Research on Composing : Points of Departure* by Cooper and Odell. Cooper and Odell charged that the data produced by empirical research, as exemplified in Braddock, et al., did not reflect the way either professionals or students wrote. Cooper and Odell not only challenged the empirical research tradition as being inadequate, they claimed that what was missing was a grounded theory on the process of composing. Cooper and Odell's goal was to redirect and revitalize research in written composition. They proposed to achieve this goal by promoting the use of a variety of methodologies and called for "multidisciplinary investigations characterized by synthesized research methods"

(Burnham, 1984, p. 201). Cooper and Odell cited research by Emig (1971), in which she examined the actual composing processes of skillful student writers and professional writers through a descriptive case-study method as one example of the new direction research should take based on grounded theory.

Larsen (1983) stated that Janet Emig was first to see theoretical possibilities in the term "process". According to Larsen, Emig studied the composing processes of eight twelfth graders and, in 1971, produced a monograph based on her 1969 doctoral dissertation. The result, *The Composing Processes of Twelfth Graders*, was significant to the study of composition in several ways. Emig divided stages of composition into three parts prewriting, writing, and rewriting. Emig also suggested a high degree of recursiveness among the stages rather than a linear view. Central to Emig's study was the collection and analysis of data about the ideas of individual writers about their own processes, rather than the final texts produced. Finally, Emig observed that professional writing and what professional writers had to say about how they wrote could enlighten composition teaching methods. Larsen noted that Emig's terminology and view of the composing process as recursive had been generally accepted in composition

research and pedagogy since 1971.

Langer and Allington (1992) found that the 1970's and 1980's witnessed the increasing popularity of "writing process" approaches to instruction. Langer and Applebee (1987) also described the 1970's and 1980's as an era that brought major changes in accepted approaches to writing instruction. They stated that the groundswell of support for "process" approaches to the teaching of writing was a reversal of the emphasis on the final written product evident in previous decades. According to Langer and Applebee, recommendations for how process approaches could best be implemented dominated the journal literature during this period. The authors credited the National Writing Project for having helped to make process writing approaches widely known.

Silberman (1989) stated that the National Writing Project (NWP), founded by James Gray, was an outgrowth of the Bay Area Writing Project (BAWP), also founded by Gray at the University of California - Berkeley in 1973. Gray founded the BAWP in response to what he perceived as the reason students had difficulty with writing. Gray recognized that the problem of poor writing by students could be traced to the lack of effective teaching of writing. However, he did not blame classroom teachers. After all, Gray noted there were no

state requirements that English teachers take even one course in writing. In addition, Gray pointed out that elementary school teachers were expected to teach the three R's, "although they studied only two -- with an emphasis on reading" (p. 60). The results of such misguided policies, according to Gray, were that at the end of four years of training, most teachers could not teach students how to write because no one had taught them the techniques they would need. Further, Gray stated, most teachers did not know how to write either (Silberman, 1989).

According to Silberman, Gray founded the BAWP as a collaborative effort between the University of California - Berkeley and the public schools of the San Francisco Bay Area. Gray's plan called for having teachers learn how to improve writing instruction from other successful teachers. He operationalized this plan by establishing a five-week summer institute at Berkeley's campus. Initially Gray invited twenty-five exceptional teachers who had developed proven classroom strategies to become "fellows". During the five-week institute they were expected to demonstrate their methods to one another. These "fellows" then became "teacher consultants", leading in-service writing workshops for colleagues. Gray's institute concept proved to be so successful that it soon expanded

into the National Writing Project with 165 regional centers at campuses throughout the United States. According to Neill (1982) the NWP, modeled after the BAWP, promoted no single philosophy or methodology. Instead, teachers were presented with a variety of of theories and apprcaches they could explore and discuss. The institutes had, however, evolved a core of topics considered important to successful writing instruction:

> The composing process: prewriting activities through revision. Syntax: rhetoric developed by Francis Christensen, sentence combining, examination of common errors.
>
> Sequence: from personal writing to analytical writing, forming the thesis, patterns of reasoning, sources of content.
>
> Small-group techniques: peer criticism, writing to real audiences within the classroom, reading aloud in small groups.
>
> Writing assessment: holistic and cloze reading techniques, schoolwide assessment. (Neil, 1982, p.61).

Langer and Allington (1992) described the 1980's as a period when composition research seemed to have divided into two camps; cognitive approaches and social approaches. Bizzell (1986) differentiated the cognitive perspective of composition research from the social/cultural perspective. The cognitive approach

focused on the individual writer's mind and attributed differences in performance to personal-style factors and differences in individual talent. According to Langer and Allington, the social/cultural approach was rooted in sociolinguistic and anthropological research methodologies which gained prominence during the 1970's and early 1980's. Gumperz (1986) described the origin of sociolinguistic research as a concern for the gap in educational achievement that had become a major social problem during the 1960's, when it became apparent that children of low income and of ethnic minority background did not perform as well in schools as other populations. Particularly troublesome, according to Gumperz, was the fact that poor minority students were grossly overrepresented among school failures. Many in the sociolinguistics field argued that since institutional reform alone had been ineffective, it was necessary to look to the background and personal attributes of individual students to explain the differences in performance. For the most part this research investigated linguistic deprivation and linguistic relativity in school settings. The social/cultural perspective grew out of the sociolinguistic approach and broadened concerns beyond speech to include social and cultural factors that influenced the individual writer's performance. This second group of researchers refused to

accept that the difference between individuals' performances was due to individual talent. Rather, they argued that differences in performances correlated to socioeconomic and ethnic groups. In light of this correlation, they concluded that social and cultural factors influenced an individual's composing skills.

Scardamalia and Bereiter (1986) attributed much of the theoretical research on writing done during the 1980's to newly developed cognitive models for investigating the nature of the composing process. They cited the use of protocol analysis or "think aloud" procedures as one method to allow researchers to investigate what went on in the individual writer's mind as composing occurred. This procedure led to the development of a composing model by Hayes and Flower which Scardamalia and Bereiter described as "The model that gives the most explicit account of mental operations" (p. 781).

Scardamalia and Bereiter stated that according to the Hayes and Flower model, the main parts of the composing process were planning, translating, and reviewing. Central to planning was generating ideas. Ideas were edited and arranged to create a plan that controlled the process of actual text production (known as translating). Some of the generated ideas, however, were ideas of

goals to be pursued, and these were stored for later use throughout the composing process. According to Scardamalia and Bereiter, the model claimed to account for the large diversity of mental events during composition on the basis of a small number of subprocesses. This is accomplished by a control structure, called the executive control, which allowed nearly any subprocess to incorporate any other subprocess. Thus, the whole planning process might be called up in the service of editing, or the reviewing process might be called up for purposes of arriving at an organizing decision. This property of the model, called "recursion", sets this model apart from most linear step-by-step models of composition.

Langer (1987, 1991, 1992) suggested that cognitive and social approaches to improving writing instruction could be accommodated through what she termed a "sociocognitive" perspective on literacy. Langer (1991) stated that people in general associate literacy with the ability to read and write. However, Langer proposed a broader and educationally more productive view. According to Langer, literacy should be defined as the "ability to think and reason like a literate person, *within a particular society*" (1991, p. 11). The sociocognitive perspective views literacy learning as socially based and cognitive (ways of thinking) in that the ways of thinking grow

out of socially based experiences.

Langer (1991) acknowledged that the sociocognitive perspective held important implications for the ways in which literacy learning and issues of schooling are addressed. Four ways this learning could take place were presented. First, it could come about simply through interaction -- students would see what worked and what didn't and modify their own performance accordingly. Second, learning could result from models that others provided either through discussion or through demonstration (formally or informally). Third, because students bring differing strengths to learning situations they could learn from each other. Finally, learning could take the form of direct instruction from a teacher or through a structured situation where the teacher's role would be as a guide or facilitator.

Review on Effective Writing Instruction

Throughout this century a tension has existed between those researchers who believe improving writing instruction can best be achieved by studying students' products and those who believe the appropriate focus is what students do during the process of creating their products. In the last thirty years this has taken the form of a debate over product versus process focused research (Langer and

Allington, 1992). From a pedagogical perspective, writing involves both consideration of the process and the end product itself (Beal, in McCormick, Miller, & Pressley, 1989; Emig, 1977).

Moving away from the theoretical debate over whether research should focus on process or product, recent research validates the importance of both and involves an attempt to identify how process and product interact to create optimal conditions within the context of learning to write (Applebee, 1986; Good & Brophy,1990; Hillocks, 1986; Langer & Allington,1991). Findings from these investigations suggest that children can be taught to improve their writing skills through strategies that focus on (1) the mode of instruction, and (2) the content of instruction.

Considerable research has been conducted on the role assumed by the teacher and resulting student achievement in general. Much of this research is the result of attempts to improve teacher effectiveness by changing teacher evaluation or by changing teacher education. Medley (1978) stated that changes in either teacher evaluation or teacher education can result in improvement only if they reflect accurate information about how the behavior of more effective teachers differs from that of less effective ones. Considerable evidence was generated during the 1970's and 1980's

on what variables constituted effective teacher behavior.

For example, research on teacher effectiveness conducted by Good, Biddle, and Brophy (1975) and Airasian, Madaus, and Rakow (1978) concluded that teachers do make a difference in student achievement. Some teachers elicit greater student gains in learning than do other teachers, and this success is tied to consistent differences in teaching behavior. Furthermore, research on teacher effectiveness has suggested that teacher effectiveness exists in *clusters of behaviors* rather than as a single variable, and that these clusters of behaviors collectively make a difference in student learning outcomes (Bennett, 1976; McDonald & Elias, 1976; Stallings, Needels, & Staybrook, 1979). The more notable variables which make up the clusters of behaviors include direct instruction, time-on-task, classroom management, teacher feedback, and psychological factors affecting the student.

Barak Rosenshine (1979), determined that effective teachers utilize the variable of direct instruction, where goals are clear to students, time allocated to instruction is ample and continuous, coverage of content is thorough, performance of students is monitored, instruction is success oriented, and feedback to students is immediate. Rosenshine concluded that direct instruction, which

he discussed in terms of student *engaged time* and *teacher monitoring of student activities*, is more likely to produce student learning gains than less teacher-directed approaches.

Stallings and Kaskowitz (1974) not only investigated teacher behaviors but also related those behaviors to the students' roles in instructional programs. The researchers found that where students' roles were broadened to allow for student initiative, and where access to a wide variety of materials and activities dominated the learning environment, students were better able to see the relationships between subskill objectives of individual lessons and larger learning concepts of entire units. Stallings and Kaskowitz also concluded that these students demonstrated more independent and cooperative behavior.

Cooperative learning studies, which also expanded students' roles in taking initiative in their own learning, have demonstrated increases in achievement and cooperative behavior (Johnson & Johnson,1975; Slavin, 1980). Other studies that recognized the social nature of learning validate the need for students to be active participants in their learning (Heath, 1983; McDermott, 1977; & Cazden, 1988).

Mode of Instruction

Mode of instruction refers to the role assumed by the classroom teacher, the kinds and order of activities present, and the specificity and clarity of objectives and learning tasks (Hillocks, 1986). The following studies reviewed the influence of mode of instruction on written composition. Specifically, they examined: non-directional/natural process mode, in which the teacher facilitates student-initiated writing in a minimally structured positive classroom atmosphere; individualized mode, in which students work individually with programmed materials; environmental mode, which combines teacher presentation with small group problem-centered activities conducive to high levels of peer interaction concerning specific tasks; and, presentational mode, characterized by teacher-dominated lecture, discussion, and extensive practice (Hillocks, 1986).

Bennett (1976) was one of the earliest researchers to study teacher's mode of instruction in relation to composition. In a series of studies conducted in Great Britain, Bennett investigated the popular contention that students encouraged to write in a free, fluent manner with an emphasis on personal expression and taught in a minimally structured environment would produce more creative

compositions than students taught in a more formal setting. After sorting teachers into a clustering of four teaching styles, ranging from formal to informal, Bennett proceeded to investigate the influence the various teaching styles had on students' writings. Bennett found no significant differences in "creative writing" between students instructed in formal or informal teaching situations. The researcher concluded, "There is little in these results to support the widely held view that informal teaching produces pupils who are more likely to respond more imaginatively in writing than do those who are being taught more formally" (p. 119).

Two studies by Thibodeau and Thibodeau (1963), involving 500 sixth grade children, demonstrated the effectiveness of the environmental mode of instruction over the individualized mode. Thibodeau and Thibodeau studied the effects of elaborative thinking and vocabulary enrichment exercises on written composition and on improving composition writing with grammar and organizational exercises. Utilizing differentiated group patterns, pupils were divided into three groups: Group A worked in pupil teams, Group B worked individually and the Control group worked on the program called for by the conventional language curriculum. Results

indicated, in general, that the pupil team group produced a greater amount of gain in written composition than those in the group that worked on the materials individually or those in the Control group.

Hillocks (1981), conducted a study of three modes of instruction in freshman English classes at a large midwestern university to assess student attitudes. On the basis of classroom observations and interviews, researchers classified instructors as teaching in the presentational, nondirectional, or environmental mode. Each student was given a questionnaire to determine attitudes toward these teacher presentation modes. Analysis of the questionnaires revealed highly significant differences among students taught in the three modes on eleven factors examined. Attitudes were most positive among students taught in the environmental mode and least positive among those taught by instructors classified as nondirectional. Hillocks's study established different effects for different patterns of instructional practices but did not involve measures of growth in composition ability.

Though Hillocks's initial study focused on student attitudes rather than on growth in composition ability, a later meta-analysis conducted in 1984 examined every experimental study on writing conducted between 1963 and 1982. Hillocks found that the

environmental mode was responsible for higher gains in student composition achievement than the other modes. The difference between the environmental mode and non-directional/natural process mode was significant at $p < .0001 (z = 4.15)$. The difference between the environmental mode and the individualized mode was significant at $p < .0005$ ($z = 3.66$). Mean effect sizes for the four modes were: Environmental (.44); non-directional/natural process (.19); individualized (.17); and, presentational (.02).

Hillocks (1986), identified several assumptions that underlie the environmental mode of instruction. One is that teaching can and should actively seek to develop identifiable skills in learners. A second is that these skills are developed by using them orally before using them in writing. A third assumption is that one major function of prewriting activity is to develop these skills. A fourth assumption is that the use of such skills is often complex, and therefore may require collaboration with and feedback from others. Hillocks noted that such collaboration and feedback may be achieved through the interaction of students as they worked together to solve problems.

These assumptions led Hillocks (1986) to specify the following as characteristics of environmental mode:

(1) clear and specific objectives, e.g., to increase the use of specific detail and figurative language;

(2) materials and problems selected to engage students with each other in specifiable processes important to some particular aspect of writing; and

(3) activities, such as small-group problem-centered discussions, conducive to high levels of peer interaction concerning specific tasks (p.122).

These characteristics and Hillocks's findings regarding the environmental mode of instruction are consistent with findings from teacher effectiveness research.

Content of Instruction

In addition to the mode of instruction a second dimension of writing instruction, *focus of instruction*, has shown a positive relationship to improving students' writing skills (Hillocks, 1986). Hillocks defined focus of instruction as, "the dominant content of instruction" (p. 113). Whereas mode of instruction emphasized the role of the teacher, foci of instruction were concerned with types of content or activities that had a beneficial effect on writing. Hillocks defined six types or categories of foci of instruction. Two of the six foci, *study of model compositions* and *use of scales*, are

pertinent to this study. Study of model compositions (models) and use of scales (scales) direct students toward learning criteria believed to exemplify various properties of good writing. These foci are used to guide the production of writing and to judge the effectiveness of written products.

According to Knudson (1989), one of the oldest ways to teach children to write was by presenting them with model pieces of writing. It was assumed that students somehow would be able to transfer what they saw in the model to their own writing. Instruction using model pieces of writing involves making connections between reading and writing. According to Smith (1982), much of what students learn about writing results from exposure to examples. It is assumed that knowledge is somehow obtained from reading the examples. Reading usually gives no clue to the process through which the author works to create the text. It is assumed that knowledge of writing through reading directs attention separate from that required to comprehend the text. According to Scardamalia and Bereiter (1986) there is little research on how students extract literary knowledge from examples, although it is known that students from third grade up can extract knowledge of literary features from model texts. Studies which

found that presentation of model pieces of writing were effective in improving student composition had several common characteristics. Thibodeau (1964), Pinkham (1969), Andreach (1976), Wood (1978), and Laurencio (1984) all found that teaching with literary models increased students' organization and resulted in improvement in the mechanics of writing (op. cit., Scardamalia & Bereiter, 1986).

For example, Pinkham (1968), used lessons emphasizing the characteristics of good writing to investigate the effect of models on students written expression. The characteristics of good writing were based on models of literature. The literary selections were chosen to demonstrate the "aims" of written expression. These aims were presented in lesson patterns in which experience, practice in writing, and rewriting after evaluation were used to enhance the writing effort.

The 180 fifth grade students participating in Pinkham's study were divided among four schools with one experimental and one control class in each. Two of the schools were in urban areas and two were in suburban areas.

The series of lessons was administered to the experimental group. Equal time for listening to literature and for writing through a less structured pattern was provided in the control group.

Significant differences were found in favor of all experimental groups in areas measured by the STEP Writing Test (Organization, Conventions, Critical Thinking, Effectiveness, Appropriateness).

Another study that exemplified the use of models was conducted by Stefl (1981). Stefl demonstrated that elementary school children could learn to use models to become more effective at writing descriptive paragraphs. Subjects were 196 third grade students who were randomly assigned to the Experimental, Contrast One and Contrast Two Groups. The study was conducted over a four-week period during which the Experimental and Contrast One Groups met with the investigator for a half-hour, twice a week.

The experimental procedure included having the group choose the most descriptive paragraph from two written samples about an unusual animal, discussing why the one chosen was more descriptive and then re-writing the other paragraph using the most descriptive paragraph as a model while viewing a slide of the described animal. The Contrast One Group procedures included having the group view a slide of an unusual animal (same slide as used for the Experimental Group) and then having the group write a description of the animal. Before each writing session, each subject's description from the previous session was returned and the investigator's written

remarks were read. The procedure for the Contrast Two Group was the regular classroom approach to writing under the direction of the classroom teacher.

The effectiveness of the treatment was assessed by making comparisons between the pre- and posttest gain scores of subjects in three categories: general writing; descriptive writing; and, attitudes toward writing. Results demonstrated that experimental groups improved significantly in ability to write descriptive paragraphs as well as their ability to discriminate descriptive paragraphs. Results regarding general writing ability were inconclusive.

A second focus of instruction identified by Hillocks (1986) is use of scales or sets of criteria. Sets of criteria are characteristics or features of composition such as elaboration, vocabulary, organization, or structure and are meant to represent aspects of good writing. Scales assign a numerical value to these features of writing. Writers use scales or sets of criteria to determine the extent to which writing exhibits features identified as being important to various forms of composition. Use of scales and sets of criteria have also shown positive effects on students' compositions.

For example, In an effort to improve the quality of students' writing, Sager (1973), designed a study that taught students how to use a descriptive writing scale to evaluate their compositions. Students were taught to rate their own pieces of writing and the writing of their peers according to four components: vocabulary; elaboration; organization; and, structure. The purposes of Sager's study were to determine whether (1) the quality of composition would improve, and (2) the children could use the scale to rate compositions.

The study consisted of two groups of sixth grade children. The Experimental Group followed the program designed to teach the components and use of the scale. The Control Group studied the same four components of composition but followed procedures outlined in the school curriculum guide. Teachers were asked to keep weekly logs of the activities used. Lessons in both groups were conducted for periods of forty-five minutes, five days a week, for eight weeks. Both groups received the same incentives for creative writing and the same amount of practice in writing stories.

In the beginning of the study, objective measures of IQ and writing ability and a sample composition were collected from each child. At the end of the study a final composition was collected.

Story ratings for ten stories were also collected from the students in the experimental group to determine whether they could learn to be reliable raters.

The quality of written composition in both the initial and final stories was measured by a scale constructed by Sager for this study. Adult raters who were trained to use the scale scored the compositions. The stories were coded so that the raters would have no idea whether the stories were initial or final stories or whether they belonged to the experimental or control group.

Statistical analyses showed that the quality of written composition was improved as a result of teaching students the knowledge and use of a descriptive writing scale. Students learned to use the rating scale to improve the quality of their writing by scoring their own compositions and those of other students. In each of the four areas tested, the improvement made by students in the experimental group was significantly greater than that made by students in the control group.

In the conclusion to his meta-analysis on composition, Hillocks (1984) identified research on the interaction of variables within the dimension of instructional focus as a promising area for investigation. He theorized that if foci of instruction produce

individual positive results, there may be advantages to mixing foci in various combinations to check for cumulative effects.

Research on combining models and scales was conducted by Knudson (1989). She investigated the use of a variety of strategies to improve the informational writing of 138 fourth, sixth, and eighth grade students. The four strategies studied were: models, scales, models in combination with scales, and free writing. The first strategy, presentation of model pieces of writing, emphasized the "product" of good writing. Strategy two, presentation of scales, questions, and criteria, explicitly stated to students the criteria for good writing while they engaged in all parts of the composing process. The third strategy combined the use of scales, questions and criteria with models and focused on both product and process strategies. The last strategy, free writing, was executed as a form of procedural facilitation in that students were presented with pictures and asked to write about them.

Both holistic and analytical assessments were used in evaluating students' writing. Results indicated all four strategies were significant. The most effective strategy was presentation of model pieces of writing followed by free writing. Combining models and scales did not appear to have cumulative effects.

Overview of Cognitive Strategy Instruction

Cognitive strategy instruction has been referred to by various names: Cognitive Instruction (Idol & Jones, 1991), Strategy Instruction (Pressley, 1990; Graham & Harris, 1988), Metacognitive Strategy Instruction (Good & Brophy, 1990); Self-Regulated Learning (Paris & Oka, 1986); Strategy Training (Borokowski, Johnston, & Reid, 1986); Reciprocal Teaching (Brown & Palincsar, 1982) and Teaching Strategy (Taba, 1966), Developmental Teaching (Fulton, 1985) to cite a few. Although there are a variety of forms of cognitive strategy instruction, each is built upon the same assumption: learning is a process of constructing meaning by active processing of information. What is learned is put together or constructed by the learner. Further, the basis for the new construction is in part a function of what the learner already knows, what cognitive researchers call "prior knowledge" (Anderson & Person, 1984). These researchers believe knowledge is stored in the learner's brain as networks of information called concepts or schemata. As a learner learns, connections are made between new information and the learner's existing network of knowledge. Connecting requires mental activity in the form commonly known as thinking. Thinking is manifested in a variety of forms (organizing,

analyzing, categorizing, elaborating, evaluating, etc.) and serves the purpose of "knitting" the new information into the existing networks (Fulton, 1989). It is thought that the greatest amount of learning occurs when the learner is stretched just beyond what can be handled alone, in a "zone of proximal development" (Moll, 1990). Stretching beyond what is known creates a situation where the learner could lose connection with meaning, thus the need for some type of mediation or guidance. This guidance, referred to as scaffolding, could take the form of social-mediation (input from teachers, family, peers, etc.), procedures (strategies), or a combination of both. In any case, it is believed the learner requires some type of structure as she/he connects what is known with interpretations of incoming information (Gaskins & Elliot, 1991).

Gaskins and Eliiot(1991) stated that successful learners, thinkers, and problem solvers are strategic. That is, these learners use strategies to achieve their goals. Gaskins and Elliot defined strategies as the learners' actions and thoughts that occur during learning and that influence both motivation and the acquisition, retention, and transfer of knowledge. Therefore, when learners are strategic, they are in control. They plan, evaluate, and regulate their own mental processes. The authors concluded that strategies

are the means of selecting, combining, and redesigning cognitive routines. Thus, cognitive strategies that employ procedures involving thinking skills are crucial to the quality of learning.

Pressley and Levin (1986) noted that during the 1980s, strategy instruction in academic areas became a major focus of educational research. To a great degree this can be attributed to the large amount of dissatisfaction with American schooling which surfaced throughout the 1980s. For instance, in 1979-80, data from the National Assessment of Educational Progress (NAEP) criticized the state of American education. Specifically, the report cited poor performance in reading comprehension, especially the lack of depth in thinking: "Few students could provide more than superficial responses to such tasks, and even the better responses showed little evidence of well-developed problem-solving strategies or critical-thinking skills" (in Costa, 1984, p. 4). This early assessment was followed by numerous other assessments, reports, and books equally critical of the lack of quality of student performance, particularly performance that required thinking, problem solving, or the application of knowledge. A Nation at Risk (1983), Educating Americans for the 21st Century (1983), *Horace's Compromise: The Dilemma of the American High School* (1984), The Carnegie Task

Force on Teaching as a Profession (1986), and the Holmes Group (1986) all called for changes in schooling structure, modification of the current curriculum, or creation of new teaching methods in order to develop students' thinking capabilities. This call for reform gave rise to what became known during the early 1980s as the Thinking Skills Movement (Costa, 1984).

According to Idol and Jones (1991) one of the main questions asked and answered by the Thinking Skills Movement was, "Can students' thinking improve through instruction?" The researchers stated that early studies concentrated on teaching thinking as skills separate from subject matter content. However, as the decade progressed, researchers found that although some thinking skills were generic and could be generalized, most thinking was inextricably bound to subject content (Dillon & Sternberg, 1986; Mayer, 1987; Perkins, 1986; Sternberg, 1985). Much of this research focused on experts and the way their thinking was related to subject matter knowledge or the strategies they used. Research on thinking conducted during the 1980s affirmed that students' thinking could be improved, especially when thinking skills and subject content were considered together. The growing body of evidence that thinking and subject content were embedded in one another shifted

researchers' focus toward investigating cognitive strategy instruction.

Cognitive Strategy Instruction's Relevance to Schema Theory

Cognitive instruction aims to help students by enabling them to "construct meaning from text, solve problems, select and develop effective thinking strategies, and take responsibility for their own learning as well as to transfer skills and concepts to new situations" (Idol & Jones 1991, p. 68). Idol and Jones defined cognitive instruction as any effort in teaching that helps students process information in meaningful ways or that helps students to become independent learners. This definition embodies the two goals of cognitive instruction: (1) to teach for understanding in all subject areas and (2) to help students learn how to learn (Novak & Gowin, 1984).

As briefly discussed earlier, proponents of cognitive strategy instruction emphasize two key areas of concern: the learner's role in constructing meaning as a way of understanding subject areas and the learner's employment of strategies as a means of learning how to learn. According to Good and Brophy (1990), research into these areas has led to the development of constructivist theories. These theories see learners as actively constructing meaning from input by

processing it through existing cognitive structures (schemata) and then retaining it in long-term memory. While in long-term memory, these schemata remain open to additional processing and reconstruction through a process Rumelhart and Ortony (1977) described as "tuning".

Another researcher in cognitive instruction, Lauren Resnick, stated that cognitive strategy instruction focuses on the learner's role in acquiring a means of learning to learn and is based on a new model of learning that is emerging from current cognitive science, which Resnick terms "a loose confederation of psychology, linguistics, and computer science" (Idol & Jones, 1991, p. 68). Good and Brophy (1990) traced the roots of cognitive science to the psychological works of Bartlett, Freud, Piaget, and Wertheimer, Koffka, and Kohler and the theories they developed during the early part of the twentieth century. These theories centered around human perception as it related to learning.

According to Good and Brophy (1990), current cognitive psychology encompasses perspectives from two views: the cognitive structural approach and the information-processing approach. The cognitive structural approach emphasizes the ways that subject matter has been structured in academic disciplines. This approach

is represented by the work of Kohler, Bruner, Piaget, and Ausubel. The Information-processing approach stresses cognitive structures built up by learners themselves. While the latter approach is more evident in constructivist theories, cognitive structural and information-processing approaches are viewed as complementary rather than competing. Central to both approaches is a concern for learning facts and principles in relation to a larger structure. This larger structure is referred to as a schema and represents a theoretical framework that accounts for meaningful interpretation of new input (Anderson, 1984).

In the last two decades, research in cognitive psychology and computer simulation of intelligence has investigated the manner in which information is stored and retrieved in human memory. As a result of this research, previous theories of memory have given rise to schema theory (Anderson, Spiro & Montague, 1977). Central to this theory are schemata, defined as abstract structures in memory which store concepts, prior knowledge and experiences. Various theoretical perspectives on schemata have been proposed in regard to the nature and function of these abstract structures.

The term "schema" is not new. Kant has been generally acknowledged as the first to refer to knowledge structures as

schemata in his *Critique of Pure Reason* , first published in 1781. Kant developed the notion that schemata make up one's experiences which are specifically defined by common elements and collected together in memory. Since Kant's time, the concept of schema has been used in many branches of psychology (op. cit. Anderson, Spiro & Montague, 1977).

However, Good and Brophy (1990) point out that the development of a general theory of memory by Bartlett exerted a major influence on modern schema theory. In his book, *Remembering* , published in 1932, Bartlett delineated nearly all the aspects of constructive processing currently embraced by cognitive scientists. Bartlett's studies involved recall and reproduction of stories by subjects after varying lengths of time. These studies demonstrated that forgetting was not a function of "decay" because of weak memory traces as would be predicted by behavioralist psychologists such as Ebbinghaus and Thorndike. Further, Bartlett found that contemporary behavioralist theories did not account for the significant amount of distortion he found. On the basis of his studies, Bartlett concluded instead that comprehension resulted when subjects engaged in an "effort after meaning". According to Bartlett, "All the cognitive processes--from perceiving to thinking,

are ways in which some fundamental effort after meaning seeks expression. Speaking very broadly, such effort is simply the attempt to connect something that is given with something other than itself" (Good & Brophy, 1990, p. 247). In essence, Bartlett's research demonstrated that the comprehender uses prior knowledge of the world, stored in cognitive structures called schemata, to assimilate what is read in terms of one's preexisting knowledge.

According to Spiro (1980), because Bartlett's work was inconsistent with the traditional behavioristic views which were dominant during his time his work was overlooked for many years. However, decades later, interest in schema theory re-occurred. Neisser (1976) stated that the primary focus of schema theory is the internal representation of past experience. Theoretical work on schemata since the early 1960s has been concerned with the nature and organization of knowledge. More specifically, most recent research in schema theory has attempted to provide explanations for how information is comprehended, encoded and retrieved from memory (Anderson, 1984; Bobrow & Norman, 1975; Minksy, 1975; Rumelhart, 1975; Schank & Abelson, 1977; Winograd, 1975).

Schemata represent one's knowledge of the world. The development of these structures comes as the result of interaction

with the environment. Schemata includes what is generally true about a class of things, events or situations (Rumelhart & Ortony, 1977; Anderson, 1977; Anderson, 1984). Also embedded within these knowledge structures are relationships among concepts (declarative knowledge) and actions involved (procedural knowledge). A schema for a generalized concept contains "slots" for the components that make up that particular concept. In order to describe the development of a schema, Mandler (1985) used the example of a child's first encounter with a furry animal such as a cat. For each type of a cat which the child encountered (i.e., Siamese, Tabby), different information became available to fill in and elaborate the slots of the schema for "cat." As the child's experience with cats grew, a generalized schema resulted which also coordinated with higher level schemata, such as those relating to all living things. Rumelhart (1976) asserted that as the result of experience, new information expands the existing schema, a process he called accretion. As time passes, an expanding inventory of schemata are built. When new information is encountered for which there is no existing schema, either a new schema is constructed or an existing related schema is modified to account for the new information (Rumelhart, 1976).

Implications of Cognitive Strategy Instruction for Writing

Symons, Snyder, Cariglia-Bull, and Pressley (1991) observed that an enormous amount of attention has been devoted to teaching thinking through cognitive strategy instruction in recent years. McCormick (1991) reported that two major advances had been made which were responsible for the growing popularity of cognitive strategy instruction. First, the development of more complex models of competent thinkers had helped identify critical strategies. While earlier strategy instruction focused on basic memory search models, recent research had investigated and validated more realistic and complete models (Symons, et al., 1991) . These more sophisticated models demonstrated that students could be taught to execute complex procedures resulting in improvement in academic performance. The second major advance noted by McCormick was the development of strategies that had been substantially perfected and were readily available for implementation in classroom settings. Other researchers agreed that theory and research in cognitive strategy instruction had become increasingly compatible with classroom implementation (Pressley, Goodchild, Fleet, Zajchowski & Evans 1989).

Graham and Harris (1988) argued that cognitive strategy

instruction in the area of writing is beneficial for three reasons. First, it provides an instructional mechanism for helping students gain confidence and security in the cognitive processes considered central to effective writing. Second, strategy instruction can complement and boost current methods of teaching composing such as the process approach to writing or the use of word processing. The authors stated that cognitive strategy instruction can be embedded within the process approach to writing, helping teachers meet the needs and interests of individual or groups of students as the students work to improve their writing skills. Others researchers concurred that use of cognitive strategy instruction in writing was compatible with the process approach (Bos, 1988; Englert & Raphael, 1988; Fitzgerald & Teasley, 1986). Third, cognitive strategy instruction provides various levels of support designed to help students progress as writers. According to the authors, one form of support is inherent in the strategy itself - strategies provide structure that help students organize and sequence their actions.

For example, Englert and Raphael (1988) developed a writing program, Cognitive Strategy Instruction in Writing (CSIW) by combining three different approaches to writing. Various

motivational aspects of process writing (daily writing, choice of topics, peer evaluations via group presentations, publication of student papers, and writing conferences) were combined with schema-building strategies to increase students' control over organizing and structuring text in compositions. Englert and Raphael's CSIW program is summarized in the following seven steps:

Step 1: Introduce children to text structure and strategies through the use of various examples.

Step 2: Introduce the plan think sheet.

Step 3: Introduce the organization think sheet.

Step 4: Have children create the first draft.

Step 5: Introduce the edit think sheet.

Step 6: Introduce the editor think sheet and have the children evaluate each other's papers.

Step 7: Introduce the revise think sheet and have the children revise their writing. (Pressley, Burkell, Cariglia-Bull, Lysynchuk, McGoldrick, Schneider, Snyder, Symons & Woloshyn, 1990, p. 121).

The CSIW program first introduces students to text structure and strategies through the use of various examples. Examples include both poorly structured and well structured text. After reading aloud

parts of each example, the teacher pauses and verbalizes questions that might seem unclear (e.g., "I wonder why the author chose this setting?"). Next, the teacher introduces a series of sequential "think-sheets". Students use the plan think sheet and then the organization think sheet to generate, formulate, and organize information they are going to use. Then students create their first draft. This is followed by a self-edit think sheet and then the editor think sheet where student evaluate each other's papers. Finally, the teacher introduces the revise think sheet and students revise their own writing and produce a final draft.

While the CSIW was effective in improving students' composing skill by combining process writing and schema-building strategies, Raphael, Englert and Anderson (1987) cautioned that the strength of CSIW's effectiveness varied according the teacher's orientation. The researchers found that "more successful" teachers used a variety of opportunities to evaluate the students' knowledge base, modeled strategy use, and corrected misconceptions. The "less successful" teachers made less use of opportunities to evaluate students' progress and often introduced misconceptions of the goals of writing. The less successful teachers seemed to equate editing with writing and stressed the idea of impressing the audience rather

than communicating ideas (op. cit. Pressley, et al., 1990).

The CSIW program is an example of cognitive strategy instruction that teachers can use to improve their presentations and which eventually can lead to student self-regulated strategy use (Pressley, et al., 1990). Other cognitive strategies developed to improve students' writing skills are specifically designed so that students can acquire and use them on their own. In fact, Harris and Pressley (in press) believe the overall objective of strategy instruction in all academic areas is to help students become self-regulated learners. According to these two researchers, meeting this goal requires three components: (1) teaching target strategies; (2) informing students about the use and the significance of the selected strategies; and (3) fostering the development of self-regulation skills critical to effective strategy deployment, independent strategy use, and generalization and maintenance of strategy effects. Self-Control Strategy Training (SCST), developed by Steven Graham, Karen Harris, and their colleagues at the University of Maryland is an example of just such a strategy.

SCST is a program that follows specific sequential steps. According to Graham and Harris, SCST has been used to teach poor student writers how to improve their composition skills, write

better stories, write better essays, and revise written essays. This eight step program is taught to students individually and includes the following steps:

Step 1: Introduce Task-Specific Strategy (Pre-Training)

Step 2: Review Current Performance Level and Training Rationale

Step 3: Describe the Learning Strategy

Step 4: model the Strategy and Self-Instruction

Step 5: Mastery of Strategy Steps

Step 6: Controlled Practice of Strategy Steps and Self-Instruction

Step 7: Independent Performance

Step 8: Generalization and maintenance Components
(Pressley, et al., 1990, p. 129).

SCST was developed by Graham and Harris for use with learning disabled students and was delivered through individualized instruction. It has been suggested that it could be modified and applied by regular classroom teachers and that future research should be conducted to determine the effect of such modification and implementation with regular education students (Pressley et al., 1990).

The cognitive strategy approach used in this study, Fulton's Cognitive Process of Instruction (CPOI), shares similarities with both Englert and Raphael's CSIW and Graham and Harris' SCST approach. The CPOI is a multi-step sequentially organized series of tasks designed to improve students writing skills. Like CSIW, CPOI is an example of cognitive strategy instruction that teachers can use to improve their presentations while moving students toward self-regulated strategy use. However, the CPOI, like SCST, emphasizes students acquiring and using a variety of strategies on their own. A complete explanation of the CPOI is delivered in the next section of this chapter.

Historical Overview of the Development of the CPOI

Fulton's cognitive approach to learning is called the Cognitive Process of Instruction (CPOI) and has evolved over a span of twenty years. During its evolution, the CPOI has been known as Developmental Instruction (Proper & St. Pierre, 1979) and as Developmental Teaching (Pendarvis & Howley, 1988).

Developmental Instruction

According to Proper and St. Pierre (1979) DI was designed for disadvantaged low-achievers in grades K-6, operationalizing a theory of learning combining Piagetian cognitive theory with

cognitive theories of language development. This approach consisted of several instructional strategies that together comprised what Fulton called a "curriculum free" instructional management process. An important feature of DI was that it emphasized cognitive skills and basic skills. According to Fulton's theory the basic skills, while important in themselves, were seen as vehicles for teaching the cognitive skills (Proper and St. Pierre, 1979).

Proper and St. Pierre (1979) stated that DI's instructional management process contained four components: teachers assessed students' needs; blocked out the instructional day; selected main concepts or complex skills to teach; and organized these concepts into an appropriate sequence of skills and tasks progressing from simple to complex. DI's instructional model within this four part management process involved a three-step sequenced task. Teachers first demonstrated the skill, then had students practice the skill to strengthen recall, and finally monitored students as they applied the skill in a self-directed manner. In the DI model, application was considered the critical step because, Fulton believed, through application students gained the ability to generalize and transfer learning. The primary emphasis of DI was to have students see the skill demonstrated, gain a description for the skill, and then perform

the skill in a task that required thinking (Proper and St. Pierre, 1979).

Proper and St. Pierre (1979) noted that in addition to combining Piagetian cognitive theory with cognitive theories of language development, a third feature of Fulton's DI model was the use of direct instruction. Direct instruction has traditionally stressed the view that learning results from effective instruction rather than from students' characteristics and therefore teachers should take responsibility for students' learning (Murphy, Weil, and McGreal, 1986).

Throughout its early development direct instruction was most often associated with "process/product" research on effective teaching. Rosenshine (1979), one of the earliest advocates of effective teaching, initially described those classrooms in which direct instruction was used as "academically focused, teacher-directed classrooms using sequenced and structured material" (p. 39). As a result of additional research, Rosenshine developed a broader and more generic definition for direct instruction. Rosenshine's modified definition emphasized reviews, checks for understanding and reteaching if necessary, teacher explanations, guided practice, and independent practice (1983, p.60) Brophy

(1988) has pointed out the chief limiting factor of this definition for applicability to cognitive instruction is that, in his model and others like it, Rosenshine's focus of instruction was largely on teaching basic skills in reading and mathematics. Since Fulton's DI model stressed the importance of cognitive skills, significant modifications of direct instruction were incorporated into step three of DI, where students operated in a self-directed mode. However, steps one and two remained primarily teacher directed.

Developmental Teaching

The second phase of the evolution of Fulton's instructional process occurred between 1984 and 1990, as Developmental Instruction incorporated more of the theoretical assumptions and empirical research findings being reported from brain research and cognitive science (J. L. Fulton, personal communication, January 18, 1993). Fulton stated that with the inclusion of these new influences,the instructional model changed dramatically and came to be knows as Developmental Teaching (DT). Fulton noted that a crucial element in this evolution was the emphasis given to concept development and the way new concepts were presented. A basic assumption of Fulton's earlier DI program was that learning depended on the demonstration and definition of skills in

combination with the procedure for performing skills in a task and an emphasis on the use of cognitive processes to organize the information and performance of the task. In the development of DT, Fulton strengthened this approach by positing that learning depends on the precision of the conceptual description that the student acquires. Thus in the DT program, the students' basic tasks were ones of description and performance. With this approach in mind, Fulton focused on concept development strategies which would increase student's ability to describe a concept (Fulton, personal communication, January 18, 1993).

Fulton's new DT concept development approach was built upon schema theory and combined elements of verbal learning mediators, verbal advanced organizers, visual learning mediators, semantic learning mediators, visual frameworks, and Bruner's theories on learning, concept development and design of spiraling curricula.

Concept development. Piaget and Bruner both believe that there is a hierarchy governing concept development. Piaget describes different ways of conceiving the world through developmental stages, ranging from sensorimotor to formal operations. The early, motor schemata inform later iconic and symbolic modes of conception (Good & Brophy, 1990). Good and Brophy also note that

Bruner's theory also sees the physical, or enactive mode, as more basic than and prerequisite to the development of the iconic and symbolic modes.

Bruner, like Piaget, believes learners construct internal representations called concepts. However, Bruner differs with Piaget in at least one important way. Piaget emphasizes that intellectual development takes place in discrete qualitative stages over a period of time and is tied closely to naturally occurring age-related maturation. Bruner believes that intellectual development is a step-by-step quantitative process that is matter of assisting children in moving from fundamental prerequisite knowledge to more complex forms of the same knowledge and is more a function of appropriate instruction than age-related maturation (Good & Brophy, 1990). Therefore, Bruner (1966) states that any subject matter can be taught to a child of any age to at least some degree, if the instructor presents it in a form suited to the child's level of cognitive development. This belief forms the basis for designing what Bruner terms *spiraling curricula.*

In *Toward A Theory of Instruction*, Bruner (1966) suggests six principles of learning:

(1) [Intellectual] growth is characterized by increasing

independence of response from the immediate nature of the stimulus.

(2) [Intellectual] growth depends upon internalizing events into a "storage system" that corresponds to the environment.

(3) Intellectual growth involves an increasing capacity to say to oneself and others, by means of words or symbols, what one has done or what one will do.

(4) Intellectual development depends upon a systematic and contingent interaction between a tutor and a learner.

(5) Teaching is vastly facilitated by the medium of language, which ends by being not only the medium for exchange but the instrument that the learner can then use himself in bringing order into the environment. (pp. 6-7)

(6) Intellectual development is marked by increasing the capacity to deal with several alternatives simultaneously, to tend to several sequences during the same period of time, and to allocate time and attention in a manner appropriate to these multiple demands.

These six principles form the basis for Fulton's DT instructional strategy approach. According to Fulton, two of the principles are most critical for concept development: providing adequate

information to allow students to develop a "storage system" and encouraging verbalization as a mediating factor. Further, Fulton asserts, like Bruner, that successful implementation of these principles depends on a continuing interaction between the student and teacher (Fulton, May, 1988).

Schematic presentation of concepts. Bruner's theories on concept development had considerable influence on Fulton's development of DT(Fulton, personal communication, January 18, 1992). According to Bruner, concepts have four elements: a *name*, *examples*, *attributes* (essential and nonessential), and *attribute values*. The first element, *name*, refers to a category. A category is a grouping of items according to common features. The second element, *examples*, refers to instances of the concept. *Attributes*, the third element, are the features of the example. Attributes of examples can be either essential or nonessential. Essential attributes are those that are present in the example that cause it to be included into a common category. *Attribute value*, the fourth element, is the extent to which the concept displays certain essential attributes (op. cit. Joyce & Weil, 1986). Identifying essential attributes of a concept is crucial to learning the concept, because it is the essential attributes that determine the category.

Other than in mathematics, concepts have "fuzzy boundaries." The key to acquiring clear concepts is to determine what features are essential to it. Precise definitions of concepts are those that contain essential attributes with a high degree of presence or attribute value. These precise definitions are crucial for concept formation. Without precise definitions students will tend to overextend or underextend the boundaries of the concept being learned (Bjorklund, 1989). According to Fulton, most teachers do not spend sufficient time or provide careful enough instructional sequences to enable students to acquire precise definition of concepts (Pendarvis and Howley,1988).

Pendarvis and Howley (1988) stated that studies in concept development support the notion that conceptualization occurs in the learner's mind to the extent the learner establishes an internal description of the concept based on the distinguishing attributes. Ehrenberg (1981) points out that the process of concept development begins by giving students a definition of the concept, not in verbal form presented as a series of words, but by providing students a representation of the distinguishing attributes. The process must also give students the opportunity to view and compare selected examples of the concept. By discussing how the examples are alike

and how they are different, students abstract the characteristics which distinguish all examples of that particular concept from related examples. Tennyson (1980) tested the use of identical examples alone in concept teaching. The result was incomplete concept learning by the subjects, leading to the conclusion that students need to contrast and compare related examples in order to develop a clear internal description of the concept being learned. In a similar study Swanson (1972) provided additional support for the presentation of related examples in teaching concepts. The findings of instructional research appear to support the need for strategies that guide the student in selecting and organizing the appropriate information needed, to form a clear internal representation of the concept characteristics.

The enactive mode (physical) according to Bruner's theory is the base upon which all conceptualization is built. Hart (1975) asserts that graphic representation more closely resembles physical action than does verbal representation. Fulton's DT model built on Bruner's conceptual theory base by including Hart's ideas about using visual rather than verbal mediators to facilitate learning. Thus, central to the evolution of Fulton's DT was the incorporation of visual mediators, which Fulton called a *learning visual*, to help students

construct concepts (Fulton, personal communication, January 18, 1993).

Pendarvis and Howley (1988) pointed out that a key feature of Fulton's DT was its emphasis on using mediators which were defined as cognitive structures that facilitate effective and efficient encoding of new information or conceptual knowledge. According to these two authors, there are three kinds of mediators: verbal, visual, and semantic. Verbal mediators have students state the definitions of new concepts, thereby attaching meaning to new information and making encoding and retrieval of the information easier. It is thought that verbal mediators achieve their effectiveness because each unit of verbal information (e.g., the definition of a concept) is encoded, stored, and retrieved as a set of propositions (Anderson & Bower, 1973; Gagne, 1985; Norman & Rumelhart, 1975). Visual mediators (or graphic organizers) represent concepts schematically. Semantic mediators incorporate components of verbal and visual mediators. The difference between semantic and visual mediators is subtle but significant. Whereas visual mediators emphasize the structure of the information that a teacher presents, semantic mediators emphasize the structure of concepts and their relationships to other concepts. Semantic mediators focus on the

"salient" characteristics of concepts: their relationships to subordinate and superordinate concepts, their attributes, and their exemplars (Pearson & Johnson, 1978). In this way, semantic mediators relate visual schematics to verbal propositions. Stahl and Vancil (1986) state that because of this association of verbal and visual representations of concepts, semantic mediators are more likely than visual mediators to activate students' prior knowledge. Effective use of semantic mediators, therefore, entails both a presentation of the schematic and a discussion of it. According to Pendarvis and Howley (1988), Fulton's DT utilized semantic mediators as learning visuals to organize information in ways that enabled students to remember and retrieve it. The use of these mediators was based on three theoretical premises: that the mind organizes information in networks (schemata) which change in response to new experiences, that schemata enable individuals to recognize and make sense out of new information, and that visual representation combined with verbal encoding help students relate new information to existing schemata. Research has shown that semantic mediators are the most effective mediators (McNeil, 1987; Pearson and Johnson, 1978; Smith, Shoben, and Rips, 1974; & Stahl & Vancil, 1986).

Fulton's DT featured semantic mediators in each of three substrategies utilized for concept development: *concept formation; concept construction;* and *concept dimensions.* (Fulton, personal communication, June, 1986). Although each strategy was different, all three followed general procedures for concept development similar to that advocated by Taba (1966). At the beginning of the instructional sequence for concept development, the teacher presented each concept and identified its distinguishing features. This presentation was both verbal and visual. The visual presentation was a diagrammatic representation of the concept. It showed the concept, its attributes or parts, and the relationship between them (Fulton, personal communication, June, 1986).

DT strategies emphasized using learning visuals in the teaching of *precise* descriptions of concepts. The distinguishing attributes and examples of concepts were represented visually as a pattern or structure that organized the information so that students could easily recall it. Initially, this concept structure was reduced to its fundamental attributes. Thus it formed a "base pattern" to be learned and then elaborated on later. This later elaboration meant adding additional attributes to the initial pattern, creating a spiraling curricula (Pendarvis & Howley, 1988).

Through use of a spiraling curricula and learning visuals Fulton operationalized Bruner's assertion that any subject matter could be taught to a child of any age to at least some degree, if the teacher presented it in a form suited to the child's level of cognitive development (Fulton, personal communication, January 18, 1993). Bruner believed that once subject matter was learned on a simple level, elaboration through additional inquiry was, in fact, a self-rewarding characteristic of humans. In describing the motivational power of success in learning, Bruner said, "The reward of deeper understanding is a more robust lure to effort than we have yet realized" (p. 35). Additionally, Bruner stated, "I do not think that we have begun to scratch the surface of training in visualization. . . "(p. 34). Fulton believed the structuring of concepts into spiraling curricula with visual representation helped students perform tasks that required application of the concept (Fulton, personal communication, January 18, 1993).

In Fulton's DT, before students performed tasks using the concepts, they were required to give oral or written descriptions of the concept. Their descriptions were based on the schematic presentation provided by the teacher. These required verbalizations served as learning mediators. Such mediators assisted students

with the process of encoding and memorizing the concept and, Fulton theorized, with its application. According to Fulton, these mediators aided in the retrieval of the concept and enabled students to perform application tasks more successfully (Pendarvis & Howley, 1988).

The general procedures for concept development were refined and delivered through three substrategies: concept formation; concept construction; and concept dimensions. The first step in concept formation was the teacher's introduction of the concept. In the second step, the teacher showed students the visual representation of the concept. Next, the teacher assisted students in drawing and labeling an example of the concept. Following the first substrategy, concept formation, and during the second substrategy, concept construction, students engaged in activities that enabled them to actively construct a mental image of the concept.

The concept dimensions strategy was used to teach concepts that had members or types rather than parts. Students used *semantic maps* to help categorize different elements within a hierarchy. By using a semantic map students linked new concepts to both abstract schemata and concrete examples.

The Cognitive Process of Instruction

The principles of Developmental Teaching were embodied in the Cognitive Process of Instruction (CPOI) in 1989 as an instructional delivery model. This model evolved as the result of the confluence of three major influences: the need for teaching-learning strategies; Gagne's Learning Hierarchy; and modification in the approach to direct instruction (Fulton, personal communication, January 18, 1993).

The Cognitive Process of Instruction

The Cognitive Process of Instruction (CPOI) is an "instructional process". Briefly, CPOI as an instructional process includes seven basic stages or steps: (1) Introduction of the objective; (2) guided construction of a learning visual; (3) guided construction of two examples of the objective; (4) comparison and contrast of the two constructed models; (5) practice tasks; (6) application tasks; and (7) assessment. The CPOI incorporates principles of competency-based instruction, mastery learning, visual mediators, thinking and academic content skills, direct instruction, interactional scaffolding, and spiral curricula.

The CPOI, developed by Fulton (1984, 1985, 1989), is a schema-based approach to teaching cognitive strategy instruction to

students in a variety of subject content areas. This study used the CPOI approach applied to teaching students informative writing skills. The CPOI Teaching Informative Writing Program is summarized in the following seven steps:

Step 1: Introduction
Introduce students to the basic unit of informative text structure, the paragraph, by having students interact with examples of paragraphs.

Step 2: Visual
Have student construct a "learning visual" on the parts of the paragraph.

Step 3: Examples
Have students construct (draw, label, and describe) two paragraphs.

Step 4: Compare
Have students compare and contrast the two paragraphs to acquire a description.

Step 5: Practice
Provide guided practice for students to use their acquired description to perform tasks (identification and construction) on the parts of the paragraph.

Step 6: Application
Provide multiple opportunities for students to use their description as a writing strategy.

Step 7: Assessment
Assess students mastery by having them describe the parts of the paragraph and perform the writing strategy.

According to Fulton (1990) there are three types of writing; narrative, informative, and persuasive. Teaching Informative Writing Skills (TIWS) was developed by Fulton to teach students informative writing that produces descriptions of actual things. In TIWS, descriptive writing is organized as paragraphs, short reports, or essays. The TIWS program is an example of what Fulton terms Strategy Performance Learning (SPL) which teaches students several strategies in combination with writing skills organized in spirals and performance levels.

While writing skills are organized in spirals and performance levels, strategies are taught through Fulton's CPOI. The CPOI is the process part of an instructional system that features input, process, output. In using the CPOI, the input is always a learning objective stated as a noun. The output is a newly learned strategy for performing the objective. This performance constitutes a what Fulton (1990) calls a "competency".

The need for teaching strategies. According to Fulton (1989) research on school effectiveness during the 1980's focused on the leadership role of administrators, instructional management, staff development models, and teacher evaluation criteria. While the

school effectiveness movement had improved school climate, a review of studies by Stedman (1987) indicated that the movement had not improved school achievement (op. cit. Fulton, 1989). Likewise, teacher effectiveness training conducted during the same decade resulted in a pattern of instruction based on several teaching skills. While these skills improved the way teachers presented information, they did not significantly increase achievement. Fulton believed the reason these two movements had not made a substantial difference in student achievement was because they focused on teacher behavior and what students should know rather than on how students learn. According to Fulton, to improve achievement and learning teaching skills must be based on the way students select, organize, store, and retrieve information in the performance of a task (Fulton, 1989). Teaching behaviors that take such a focus are what Goodlad calls teaching-learning strategies (Evans, 1984).

While Fulton's DT was developed as a teaching-learning strategy to help teachers teach in ways that were compatible with how students learn, DT's training relied heavily on cognitive theory, brain research, and technical vocabulary (e.g. schema, category building, informational networks, etc.). Thus DT's training was complex and required considerable knowledge and understanding of

cognitive science for teacher to become proficient in its use. Therefore, Fulton sought to simplify and strengthen the DT instructional model by creating a special teaching technology (Fulton, personal communication, January, 18, 1993).

Fulton defined teaching technology as the application of science to teaching. According to Fulton, B. F. Skinner (1968) was the first to popularize the term "teaching technology" when Skinner argued that many teachers tried to impart knowledge or to improve the student's mind without knowing how to do it; they lack the definition and *technique* of how to teach. As a result of such criticism, teaching technology became an important concept in American education by the late 1960's, mostly in the form of programmed instruction (Fulton, 1988).

A teaching technology has two main characteristics: (1) it is based on a sequence of student actions and (2) the purpose of the sequence of actions is to produce a a new student behavior. Behavioral psychologists, like Skinner, applied the teaching technology approach through the curriculum by focusing on sequencing subject matter (Fulton, 1989). Cognitive psychologists, on the other hand, applied the approach to instructional skills where the sequence of student actions was based on *how* students learned,

not what they learned (Fulton, 1989). Fulton applied this approach to the design of Developmental Teaching. The result was a seven step sequence of tasks where each task is a different student action and the outcome of the seven steps is a new student behavior, the acquisition and performance of a strategy. Fulton believes the seven step CPOI teaching technology allows teachers to use a new teaching-learning strategy approach based on cognitive science without becoming too deeply versed in the underlying cognitive science theory:

> The [CPOI] is not about cognitive science or learning conditions. It is training in a technology. The telephone, for instance, is *communication technology*. If you wanted to learn to use the telephone, you would not study physics and electronics. You would practice answering, dialing, and speaking into the phone. The [CPOI] is *teaching technology*. (Fulton, 1989, p. 1-2)

Gagne's learning hierarchy. Gagne's Learning Hierarchy provided a second major influence in transforming DT into the CPOI. Gagne' and Briggs devised a learning typology that distinguishes types of learning according to differences in what is being learned. According to Good and Brophy (1990), Gagne and Briggs' typology, like others such as Bloom's Taxonomy, are helpful as organizers for

instructional planning. One of the differences between the two typologies is the attention Gagne and Briggs have given to higher levels of learning and the conditions of learning.

Specifically, Fulton was influenced by Gagne and Briggs' theories about learning capacities categorized as *intellectual skills* . Briefly, intellectual skills are those that "permit learners to carry out symbol-based procedures" (Good & Brophy, 1990). These intellectual skills are subdivided into discriminations, concrete concepts, defined concepts, rules, and higher-order rules.

Discriminations are intellectual capabilities for detecting and responding to different physical stimuli. This capability is critical for categorizing, grouping, and comparing and contrasting. Concrete concepts are intellectual capabilities for recognizing that stimuli belong to a class that shares one or more attributes. Gagne and Briggs (in Good & Brophy, 1990) suggest teaching concrete concepts by presenting a variety of stimuli that all share the defining attributes of the concepts and by pointing out these attributes. The third intellectual skill, Defined Concepts, are capabilities for demonstrating the meanings of classes of objects, events, or relations. Gagne and Briggs suggest teaching defined concepts by first stating their definitions and then presenting examples and

nonexamples. The verbal description is meant to develop the vocabulary of concept use. Rules are capacities that have been learned when individuals can successfully deal with classes of relationships among classes of events or objects on a regular basis. These rules are taught through verbal instruction with a statement of the rule followed by guided practice. Finally, Higher-order Rules are intellectual capacities invented by learners to solve problems that are new to them. These cannot be taught directly. They must be stimulated indirectly by presenting learners with problem-solving situations (op. cit. Good & Brophy, 1990).

Fulton points out a congruence can be seen between these intellectual capacities and the seven steps of CPOI (Fulton, personal communication, January 18, 1993). The discrimination capacity is evident throughout the seven steps, but is especially important in the first four steps during concept construction. Likewise, both concrete concepts and defined concepts are capacities that are critical during CPOI steps one through four when the student is establishing a schema for the new concept. Rules and Higher-order Rules, are in fact the object of steps five, six, and seven of CPOI where students are expected to use their newly acquired description (schema) to engage in guided practice, then apply that description in

the creation and solution of new or novel problems in step six, and step seven.

Modification in the approach to direct instruction. The third major influence that helped transform DT to CPOI was the shift in emphasis of direct instruction during the past ten years. Idol and Jones (1991) pointed out that initially, the term "direct instruction" was part of the acronym for DISTAR (Direct Instruction Systems for Teaching Arithmetic and Reading). The researchers stated that this highly structured program stressed an overemphasis on large group recitation with a focus on only basic skills.

More recently, however, direct instruction has been redefined by Pearson and Leys (1985) to emphasize: (a) explicit strategy or skills instruction; (b) the gradual transfer of responsibility for learning from the teacher to the student; (c) the focus on constructing meaning and problem solving; and (d) both cognitive and metacognitive instruction.

Fulton's DT, and to a greater extent Fulton's CPOI, has incorporated components of traditional direct instruction with the more recently redefined cognitive view (Fulton, 1990). The CPOI emphasizes a predetermined structured sequence of steps focused on concept/skill mastery with explicit strategy instruction that

gradually transfers responsibility for learning from the teacher to the student. Such an approach is representative of what has become known as *scaffolding.*

According to Rosenshine and Meister (1992) scaffolds are forms of support provided by the teacher, or others, to help students bridge the gap between their current abilities and the intended learning goal. Palincsar and Brown (1984) used scaffolding as a key component of a strategy they developed to improve students reading comprehension. In discussing their use of scaffolding, Palincsar and Brown cited an important caution: students must have sufficient background ability to learn a new cognitive strategy. That is to say, students can benefit from scaffolding only if they possess enough subordinate skills or information to profit from the "stretch" provided by scaffolding. For example, in their study, in which Palincsar and Brown taught strategies designed to foster reading comprehension, they selected students whose decoding skills were near grade level, but whose comprehension was below grade level. They did not select students with poor decoding skills, because such students did not have sufficient background skills to profit from the instruction. This example illustrates a critical principle underlying the use of scaffolding: Vygotsky's concept of "zone of proximal

development" (Palincsar & Brown).

The zone of proximal development, according to Moll (op. cite. Moll, 1990) is Vygotsky's most influential concept. Vygotsky explained the development of the zone as follows:

> The child is able to copy a series of actions which surpass his or her own capacities, but only within limits. By means of copying, the child is able to perform much better when together with and guided by adults than when left alone, and can do so with understanding and independently. The difference between the level of solved tasks that can be performed with adult guidance and help and the level of independently solved tasks is the zone of proximal development. (op. cit. Hedegaard, 1990, p. 349)

Thus, the zone of proximal development is that area where the student cannot proceed alone, but can proceed when guided by a teacher using scaffolds.

Scaffolds require considerable directiveness by the teacher initially with a gradual "fading" of the teacher's role as the student becomes more competent. Relating to this scaffolding process, Vygotsky proposed that what children can perform with assistance today they can perform independently and competently tomorrow (Moll, 1990) or as Cazden (1981) stated, "performance before

competence" (op. cit. Moll, 1990).

Fulton's CPOI emphasizes building students' prior knowledge through teacher-directed schema building tasks in the first four steps thereby addressing Palincsar and Brown's concern that students have prerequisite skills in order to benefit from scaffolding. Likewise, the CPOI provides for the teacher's role to fade in the final three steps as students gain competence and eventually mastery (Fulton, 1990).

The CPOI as a Schema-Based Instructional Approach

The Cognitive Process of Instruction (CPOI), developed by Fulton (1984, 1985, 1989), involves a carefully sequenced series of teacher directed and student directed tasks designed to guide the students' construction of a schema. This schema becomes a strategy when the student uses it to perform tasks. Three basic assumptions underlie the CPOI approach: (a) Learning is an active, constructive process; (b) When the distinguishing attributes of a concept are visually represented they form a framework; (c) When learned, the framework becomes the schema for the concept.

The CPOI is based on a theoretical approach similar to Ausubel's advance organizer. Ausubel's theory of meaningful verbal learning like Fulton's CPOI, centers around three aspects of education:

> (1) how knowledge (curriculum content) is organized; (2) how the mind works to process new information (learning); and (3) how teachers can apply these ideas about curriculum and learning when they present new material to students (instruction) (Joyce & Weil, 1986, p. 71).

Ausubel's Advance Organizer Model, like Fulton's CPOI, focuses on students' *cognitive structures,* which Ausubel describes as "a person's knowledge of a particular subject matter at any given time and how well organized, clear, and stable it is." (Joyce & Weil,1986, p. 72). Likewise, both Ausubel and Fulton believe there is a parallel between the way subject matter is organized and the way people organize knowledge in their minds. Both Ausubel and Fulton subscribe to Bruner's assertion that each academic discipline has a structure of hierarchically organized concepts and these structures can be identified and taught to students (Joyce & Weil, 1986) (Fulton, 1990).

However, Fulton's CPOI approach differs from Ausubel's Advance Organizer Model in two important ways. First, in contrast to Ausubel's advance organizer, which emphasizes strengthening students knowledge that must already exist, the CPOI approach *provides the prior knowledge needed* without making any

assumptions as to whether or not the student has acquired it. Ausubel's use of an advance organizer is intended to engage prior knowledge in order to give meaning to what the student is to learn. However, if students lack the knowledge or if the knowledge is not accessible to them, the process of comprehension breaks down. When this occurs, the advance organizer cannot function as a bridge between students' prior knowledge and the incoming information. By providing a visual schema of the concept, the CPOI approach compensates for these two factors. Secondly, unlike Ausubel's advance organizer, which simply provides a "set" to facilitate the meaningfulness of new incoming information, the CPOI provides direct and systematic instruction involving a sequential series of steps through which students acquire a schema for a given concept and build competency in its use (Fulton, 1990).

The CPOI approach builds on Ausubel's work by providing the information that becomes the student's prior knowledge through schema construction. The schema which the students construct under the teacher's guidance serves as a bridge between the requisite prior knowledge and the incoming information. In the CPOI, the visual schema of the concept *functions* as prior knowledge. Because the visual schema is what the students are to learn and

because they can see it, the need for prior knowledge is minimized (Fulton, 1990).

A key feature of the CPOI is the use of visual representation. A number of authors including Long, Hein and Coggiola (1978), Meyer and Schvanevelot (1976), Collins and Quillian (1969), Ehrenberg (1981) and Savage and Armstrong (1983) agree that the manner in which information is presented is a significant factor in facilitating learning. It is assumed that conceptual knowledge is arranged in memory in interrelated networks based on the distinguishing attributes. Reutzel (1984) suggests that since schemata appear to be organized into networks, teachers can guide the student's construction of schemata by the careful selection and organization of new information.

A growing body of research in information-processing has revealed the importance of the visual representation of conceptual information as a means to assist students in organizing information in order to facilitate their performance of academic tasks (Miller, 1984; Reutzel, 1984; Noll, 1983; Sherrod, 1986). Spiro and Myers (1984) point out that the visual mode has unique features not present in the verbal mode, making it an effective processor of information. These features include the capability of the visual

system to accommodate multiple elements as a gestalt spontaneously whereas the verbal system must accommodate each component separately.

Therefore, curricular objectives to be learned, or what Fulton refers to as *competencies*, are reduced to a series of selected steps and represented as a visual framework. Essential features of the competency, or *distinguishing attributes* are transformed into a graphic. The graphic, with its distinguishing attributes, acts as a pattern for students to use in constructing a conceptual model. The conceptual model becomes the student's schema. Thus the CPOI is designed to alleviate the problems resulting from the student's lack of a pre-existing schema for the concept being introduced. For students lacking a schema, the CPOI approach guides the organization and construction of information into a framework leading to schema construction. For students with an incomplete schema, the approach clarifies the description of the concept and helps the student to see relationships among the essential components of the concept (Fulton, 1990).

Chapter 3

Methodology

The purpose of this study was to evaluate the effectiveness of cognitive strategy instruction designed to increase the writing skill of elementary school children. The central question this study sought to answer was: what is the effect of the cognitive strategy instruction delivered through the CPOI approach on the composing skill of fifth grade students?

A review of research found that both mode of instruction and focus of instruction affected the quality of students' writings (Hillocks, 1986). The CPOI cognitive strategy approach is most closely aligned with the environmental mode of instruction rather than the presentational, natural process or individualized modes. The CPOI also incorporates two foci of instruction: models and scales. Therefore the conventional process approach used in the comparison groups' treatment was modified to incorporate the environmental mode of instruction and the use of models and scales. Ensuring that the experimental and control groups in this study both used the same mode of instruction and the same foci of instruction

was necessary to the reduce the possibility that differences in results could be attributed to variables other than the CPOI approach. Other modifications to the control groups' conventional process approach were also included to increase internal validity by decreasing threats of compensatory rivalry, compensatory equalization, resentful demoralization, and experimental treatment diffusion (Borg & Gall, 1989). These modifications resulted in the researchers decision to use an experimental-comparision group design (Borg &Gall, 1989), a variation on the nonequivalent control group design (Campbell & Stanley, 1963).

Population and Sample

The site for the research study was a suburban school division in southeastern Virginia with 10 elementary schools (K-6), three intermediate or middle schools (7-8), and three high schools (9-12). Approximately 80% of the student population was white, 17% was black, and the remainder were Hispanics, Asians, and other minorities.

The target population was all fifth grade students in Virginia. The accessible population consisted of all fifth grade students in the school division. The sample consisted of five intact fifth grade class groups (N=121) at two of the elementary schools. The schools

were four miles apart. The main difference between the two sites was the size of the student population. One school had 350 students in grades K-6 with two classes per grade in K-5 and three classes in grade 6. The second school had 500 students in grades K-6 with three classes per grade level. Ethnic breakdown in the sample population was identified as twenty percent minority (black) and eighty percent Caucasian. These percentages were evenly distributed among the experimental and comparison groups.

There was a total of five intact classes involved in the study. This necessitated an uneven number of treatment and comparison groups. Each site had at least one experimental and one comparison group. The first site had one experimental group (N=21) and one comparison group (N=24) while the second site had two experimental groups (N=55) and one comparison group (N=22).

Treatments	Groups	# Subjects	School
Experimental CPOI	X(1) Group A	21	Site 1
Experimental CPOI	X(1) Group B	24	Site 2
Experimental CPOI	X(1) Group C	30	Site 2
Comparison MWP	X(2) Group D	22	Site 2
Comparison MWP	X(2) Group E	24	Site 1

Figure 3.1 Experimental and Comparison Group Information

Selection of two experimental groups, rather than two comparison groups, at the second site was the result of the participating teachers' choice. Each group was in a self-contained classroom. Each classroom was heterogeneous according to ability level and male/female mix. All five groups had an equal socioeconomic status as determined by the district's free lunch program data with approximately ten percent of subjects receiving free lunch. The Scholastic Achievement Profiles, as measured by the Iowa Test of Basic Skills when these fifth graders were in the fourth grade (March 1989), placed the subjects' average reading comprehension scores at approximately the 63rd percentile and total mathematics scores at the 65th percentile. Pupils entering first grade at theses two schools typically scored in the 50th percentile on each of three sections of the Cognitive Abilities Test. Fifteen percent of the sample student population was from military families. The demograpphics for the teachers in the experimental treatment (X1) and the comparison treatment (X2) are displayed in Figure 3.2.

Treatment	Ethnicity	Gender	Age	Experience
Group A(X1)	Caucasian	Male	40	19 years
Group B(X1)	Caucasian	Female	31	1 year
Group C(X1)	Caucasian	Female	39	9 years
Group D(X2)	Caucasian	Female	53	18 years
Group E(X2)	Caucasian	Female	50	12 years

Figure 3.2 Experimental and Comparison Teacher Demographics

Treatments

According to Applebee (in Petrosky & Bartholomae,1986) there is not one specific, clear, agreed upon definition for the process approach to teaching writing. As a result, the process approach varies from one teacher to another. However, Applebee stated that in general all process approaches share certain components. They all employ instructional activities designed to help students think through and organize their ideas before writing and to rethink and revise their initial drafts. Additional activities typically associated with process approaches include:

brainstorming, journal writing, focus on the students' ideas and experiences, small-group activities, teacher/student conferences, the provision of audiences other than the teacher,

emphasis on multiple drafts, postponement of attention to editing skills until the final draft, and elimination or deferment of grading (p. 95).

Regardless of the variety of instructional activities teachers choose, process approaches are usually divided into stages such as prewriting, drafting, revising, and editing.

Comparison Treatment

The comparison groups used the process approach to writing with some modifications (MWP). Students were taught that good writers use specific strategies to improve their composing skills. Students were taught that these strategies used model pieces of writing which contained special features that should be present in good informative writing. These features included: a topic sentence, a main idea, and elaboration through details. Teachers stressed that students could improve their composing skills by using these specific features.

During the prewriting phase students engaged in activities which focused their attention on the science content, "endangered species". These prewriting activities were followed by drafting, revising, and editing activities which focused on use of the features topic sentence, main idea, and elaborative details. Throughout this

process, comparison group teachers used student generated writing samples as model pieces to highlight effective use of these features.

Experimental Treatment

Using Fulton's (1990) Cognitive Process of Instruction (CPOI) model for *Teaching Informative Writing Skills*, students in the experimental treatment groups were also taught that good writers use specific strategies to improve their composing skills. Students were taught that they could improve their skills by using a visual representation of these strategies to guide and control their performance as they write. CPOI was designed to help students generate, organize and transcribe descriptive writing via a visual representation for a paragraph, the basic unit of informative writing. CPOI consists of seven steps: the teacher engages students' in interacting with paragraphs by identifying and grouping examples and nonexamples of paragraphs; the teacher leads students in scanning, identifying, and constructing a visual of the essential parts of the concept, paragraph; the teacher leads students in drawing, labeling, and describing two specific examples of paragraphs; the teacher guides students in comparing and contrasting the two examples to acquire a description of paragraph;

the students use their description to perform tasks on the parts of the paragraph; the students use their description as a writing strategy to generate examples of paragraphs; and students describe the parts of the paragraph and perform the writing strategy as a way of assessing mastery. A key feature of the CPOI is the construction of a visual representation, called the learning visual, guided by the teacher to provide the students with a model that contains a set of criteria for constructing and judging future paragraphs.

In steps 1-4 of the CPOI students construct a visual mental representation by focusing attention on the concept paragraph, learning a visual and verbal description of essential attributes of a "prototype" for all paragraphs, constructing two specific examples of the prototype and comparing and contrasting the two examples to abstract a visual and verbal set of criteria for all paragraphs. These first four steps result in what amounts to the construction of a description of the concept for a paragraph which students can then transform into a strategy which they use to generate descriptive writings. In steps 5-6 of the CPOI students perform the writing strategy by recalling the visual model for paragraph and applying its description on practice tasks and application tasks. Students are assessed on the strategy description and performance in step 7.

Procedures

Data Gathering

Pre- and posttests were used to assess levels of composing skill. Pre- and posttests were students' writing samples scored by Data Recognition Corporation (DRC) in Minnetonka, Minnesota under private contract with the researcher. DRC compiled results into reports and forwarded them to the researcher.

Pretests were administered one day prior to the start of the 15 day intervention period and posttests were administered one day after the intervention period ended. All tests were administered by the classroom teachers. The assessment procedures are described in detail in the instrumentation section of this chapter.

Treatments

The treatments were implemented for 15 days. Teachers had daily contact with their students, and the study was incorporated into the established instructional program. Students in the comparison group were exposed to an alternative experimental treatment in order to increase internal validity and reduce threats of compensatory rivalry, compensatory equalization, resentful demoralization, and experiment treatment diffusion.

Both treatments centered around the science/social studies

content "endangered species" for three reasons. First, the treatment groups' materials used in training teachers and students in informative writing skills were designed to integrate endangered species subject matter with the seven step CPOI training program. The topic endangered species was selected as the theme for the CPOI training manual, *Teaching Informative Writing Skills*, because this particular theme contained social studies and science concepts and because it was highly interesting to elementary school age students. Second, the time frame for the 15 day intervention period was 2:00 P.M. to 3:00 P.M. daily; the students' regularly scheduled science/social studies period. This allowed the research project to be minimally intrusive on the schools' curriculum and reduced the external validity threat "novelty and disruption". Third, the implementation of this research project was compatible with the participating schools' attempt to increase the variety and amount of writing for students by encouraging "writing across the curriculum". Thus, the researcher's request for participation was well received by administrators and teachers of these two schools.

Integrating writing with the science/social studies curriculum had been emphasized at each of the two schools for several years. Some teachers had practiced the integrated approach more

consistently than others. However, this was the first time writing and the teaching of science/social studies had been combined systematically in such a focused effort. Because the CPOI was completely new to the students and the process approach to writing had traditionally been used, the risk of "Hawthorne Effect" threatened the external validity.

The Hawthorne Effect was controlled for in this study by having the comparison group also receive a treatment. This treatment is best described as an modified writing process approach featuring the use of model pieces of writing and use of scales to highlight important features expected to be present in students' compositions. In addition to adopting the same endangered species themes, the comparison group received the same extra attention as the experimental group. For example, on the first day the experimental groups were involved in a special demonstration of how imaging can significantly improve one's memory. This demonstration was very entertaining and well received by the experimental groups. To hold constant any extraneous variable effect, the comparison groups also had a special presentation on the first day of the intervention. The staff of the Virginia Living Museum presented their endangered species animal collection to the comparison groups. Thus, both

groups began the treatment period unit with a special introduction.

Additional steps were taken throughout the intervention period to ensure equalization of attention. Since the experimental treatment groups used some special materials, such as endangered animal posters, the comparison treatment groups also received and used comparable materials. In addition, all groups wrote the same total amount of time although the amount of daily writing may have varied between the experimental and comparison groups. Likewise, all groups engaged in writing activities organized around large group and small group activities focused on practicing the procedures and objectives of each particular treatment.

Prior to beginning the research, an orientation was held at each school for all subjects so they understood the purpose of the study; to give them practice in a strategy which focused on improving their writing skills. Experimental and comparison groups at each school met together for this orientation. Neither knew which was the experimental group and which was the comparison group. This orientation increased the internal validity of the results since the subjects knew the reasons for the procedures and understood the purpose of the study.

Testing and instruction periods were the same in both schools

(2:00-3:00 P.M. daily) during the regularly scheduled subject periods for science/social studies. The 15 day intervention was compatible with the existing curriculum time frames since subject areas were typically taught in three week units. At one of the sites students stayed with their regular classroom teachers (Experimental Group A and Comparison Group E) for this time period while students at the other site (Experimental Groups B and C and Comparison Group D) changed classrooms and teachers as they had all year. At this second site students had been assigned to teachers randomly at the beginning of the year. The researcher observed and met with teachers at both sites at least twice each week to check on treatment fidelity and answer questions as well as offer feedback when appropriate.

Experimental Group Teacher Training

The experimental group teachers were trained by the researcher, a certified trainer, approved by the Developmental Skills Institute. Typically, training in the CPOI is conducted through seminars that accommodate up to 60 teachers and requires 15 clock hours for trainees to work through the manual *Teaching Informative Writing Skills* . However, because training for this study involved only three teachers, a much shorter training time was needed. The

experimental teachers' training consisted of two sessions. The first session was a three hour introduction session. At this session, the trainer gave a mini-lecture and overview of cognitive psychology as it applies to the CPOI, a demonstration of the use of visualizing images as a learning mediator, and a simulation of the seven steps of CPOI using the mathematics objective "Fraction". In this simulation lesson the trainer played the role of teacher and the teachers played the role of students. At the end of each of the seven steps, there was a question and answer period. The second session lasted six hours. During this session, the trainer used the training manual *Teaching Informative Writing Skills* (pages 1-102) and the accompanying Beginner Level activities to guide the teachers through the seven steps of CPOI as they are used to teach "Paragraph", "Information Paragraph Pattern", and "Main Idea Paragraph Pattern". Teachers were instructed how to use the Main Idea Paragraph strategy to generate writing samples for use as models. Teachers were also instructed in how to use of the Main Idea Paragraph visual as a set of criteria to evaluate writing samples according to specific features.

Experimental Group Procedures

The experimental group procedures focused on developing

familiarity and facility with several visual learning mediators (Scanner, Harold: Six Ways to Describe, paragraph learning visual, information paragraph learning visual, main idea paragraph learning visual, and Paragraph Writing Strategy and Information Finder) to generate descriptions of animals and other "things". Further, they learned strategies in the form of visual patterns (paragraph pattern, information paragraph pattern and main idea paragraph pattern) through concept construction techniques and used these patterns to organize the information they had generated. The two emphases in the experimental treatment group procedures were: 1) Use of visual/imaging elaborative processes in conjunction with higher order thinking skills to "knit" information into information networks regarding a specific concept (main idea paragraph); and 2) generation of multiple specific examples of a concept (main idea paragraph) to increase category/network size. The product of these two emphases was a strategy, stored in a visual pattern, which the student could retrieve and use to generate a main idea paragraph about the description of some "thing".

In the first nine days of the treatment intervention, the teacher used direct instruction along with large and small group discussion to guide students in the use of specific learning visuals and

construction of specific concepts. During this period, a typical daily session looked like the following:

Day 4 - The teacher reviewed CPOI steps 1-4, focused the students on the visual representation of the objective, "paragraph", and provided an identification practice task and a construction task on the objective.

In the last six days, the students were generating and critiquing multiple examples of main idea paragraphs in large group, small group and individual work. A typical daily session looked like the following:

Day 14 - Students worked in cooperative groups to complete an application task using the "Paragraph Writing Strategy and Information Finder". This task included writing at least two paragraphs, each with a different controlling idea. Groups exchanged assignments with each other and used the visual strategies, "Main Idea Paragraph Pattern", and "Paragraph Writing Strategy and Information Finder", as sets of criteria to check and critique the other groups' writing samples.

For additional specific day by day procedures see Appendix A.

Comparison Group Teacher Training

The comparison group teachers did not require training because

they had already been trained in using the writing process approach. However, the researcher met with the comparison group teachers and provided each one with definitions and descriptions of the environmental mode of instruction and use of models and scales as foci of instruction (Appendix B). After reviewing the definitions and descriptions, the researcher and teachers discussed the environmental mode of instruction as well as the two foci to calibrate a common understanding of the modified writing process approach they were to use. During the discussion, the comparison group teachers concluded that their typical instructional pattern was in fact the environmental mode. At the end of the review, the comparison group teachers stated that modification of their conventional writing process approach by including models and scales would not require extensive changes. Observations during the intervention period by the researcher validated the comparison group teachers' conclusions regarding their mode of instruction and their use of models and scales foci.

As a final component of preparation, the comparison group teachers were given parameters regarding the need for treatment fidelity between their daily procedures, total amount of time for students to spend writing (to be comparable with the experimental

treatment group time allocation), use of large and small group activities with peer interactions (comparable with experimental treatment group).

Comparison Group Procedures

A typical daily session included a teacher directed mini-lecture or prewriting activity, demonstration, discussion or exhibit regarding an endangered animal (approximately 15 minutes) followed by large group or small group activities (approximately 15 minutes) and culminated in a writing activity (approximately 30 minutes).

Instrumentation

The writing test used in this study paralleled one developed by the Virginia Department of Education (VDOE) to measure writing proficiency. This test required students to write a composition in response to a prompt. The test modeled the writing process by suggesting to students that they plan, prewrite, proofread, edit, and revise their work. Writing samples were scored on each of five domains: composing, style, sentence formation, usage, and mechanics. According to the VDOE, the scoring rubrics for these domains are based on theory and research in the development of children's writing ability (Draft, VA DOE, Division of Assessment and Testing, 1992).

In this type of authentic performance assessment, writing prompts are presented in the form of a title, to start the writer composing. "My best friend", "The disappearing machine", or "Meeting a dragon on your way to school" are typical prompts employed to elicit student writing samples and do not provide any assistance in helping the subject become test-wise.

Pre- and posttest prompts used in this study were developed by the VDOE to sample students writing proficiency (Appendix D). Both of the prompts used in this study were from a series of ten and had been administered to fourth graders three years prior to this study. Thus, none of the fifth grade subjects in this study would have responded to these prompts and use of the two prompts would not endanger the validity of future VDOE testing (E. Grainger, personal communication, March 25, 1991).

Scoring of the pretest and posttest papers was based on a holistic scoring scale of 1-4 and also on a domain scoring scale of 1-4. In this scoring, the observation of writing was divided into several domains each of which was comprised of various features. Each domain was evaluated holistically, with the domain score indicating the extent to which the features appeared to be under the control of the writer. Thus, an awareness of the features and their

use contributed to the score, but the score was a judgment of the whole domain and not simply a counting of demonstrated features. Although subjects' papers were scored in all domains, only the composing domain score was used in this study's investigation. The scale used for scoring is as follows:

4 = The writer demonstrates **consistent**, though not necessarily perfect, control* of almost all the domain's features.

3 = The writer demonstrates **reasonable** but not consistent, control* of most of the domain's features indicating some weakness in the domain.

2 = The writer demonstrates enough **inconsistent** control* of several features to indicate significant weakness in the domain.

1 = The writer demonstrates **little or no** control* of most of the domain's features.

*Control: The ability to use a given feature of written language effectively at appropriate grade level. A paper receives a higher score to the extent that it demonstrates control of the features in each domain.

All students' papers were read by at least two readers, with the final score being the total of both readings. In cases where the two

readers' scores differed beyond an acceptable norm in any domain, the paper was read by a third reader. The final score in that domain was the sum of the third reader's score plus the one of the two previous scores that was identical to the third reader's, or plus the higher of the previous scores.

Domain scoring of the students' papers was a most appropriate measure to use in this study for two reasons. First, composing was assessed through actual pieces of writing (Hillocks, 1986). Second, domain scoring reported specific changes in pupil performance which occurred as a result of changing the instructional strategy (Borg & Gall, 1989).

This study's pre- and posttests were scored at the same time as the Virginia Literacy Program Writing Tests. Validity and reliability of the scoring of pre- and posttests was achieved at Data Recognition Corporation (DRC) by the use of "Anchor papers" and "Validity and Recalibration papers". Anchor papers are student writing samples prescored by experts and used to define and operationalize scoring scales during the training of readers. Anchor papers are used year after year by DRC to ensure that the scoring standard does not change. In addition, anchor papers were used to assure inter-reader agreement. How each reader scored an anchor

paper was compared with the other person who scored the paper. Inter-reader reliability was monitored throughout the scoring session by reviewing the reliability reports that were produced daily. Validity and Recalibration papers were used throughout the scoring session to monitor the scoring by comparing each reader's scores to preassigned scores on "live" papers. These live papers were selected from student sample papers and prescored by DRC personnel. Validity papers were used to check intra-reader reliability by comparing the predetermined score to that assigned by the reader. This information was reported twice a day. Readers falling below a certain standard were given immediate retraining and all compositions previously scored by these readers were scored again by readers who had met accuracy criteria (S. Trent, personal communication, November 26, 1990).

Research Design

The nonequivalent comparison-group design (Borg & Gall,1989), a variation on the nonequivalent control-group design (Campbell & Stanley, 1963) diagramed below was used in this research study.

0 X(1) 0

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0 X(2) 0

Where X(1) experimental treatment featured the "Main Idea Paragraph Pattern" strategy taught through the Cognitive Process of Instruction (CPOI) approach; and X(2) comparison group featured the modified conventional writing process approach.

This design was used because the treatment had to be administered to intact groups, making random assignment of subjects to experimental and comparison groups impossible. In this design, groups are assumed to be equivalent and pretests are administered to allow statistical control of any differences (Borg & Gall, 1989).

A variation on the standard nonequivalent control-group design was necessary to avoid internal validity threats of compensatory rivalry, compensatory equalization, resentful demoralization, and experimental treatment diffusion (Borg & Gall, 1989).

There were three experimental treatment groups and two comparison groups. All three experimental treatment groups received the same CPOI "Main Idea Paragraph Pattern" strategy treatment. Both comparison groups received the same modified conventional writing process approach treatment. A pretest, treatment, posttest method was employed to increase internal validity. After the pretest was administered, all groups received 15

days of writing instruction in one of the two approaches. At the end of the 15 days a posttest was administered to measure the impact of the treatments on students' writing skills, specifically the composing domain (see data gathering methods for further details).

Specific Null Hypothesis

The following null hypothesis was tested:

1. There will be no significant difference in composing skill between the experimental and comparison groups as measured by holistic and domain scoring of writing samples.

Statistical Analysis

The hypothesis was tested using analysis of covariance (ANCOVA). For each measure the pretest score was used as the covariate, and the posttest score was the dependent variable. ANCOVA statistically reduces the effect of initial group differences by making compensating adjustments to the posttest means of the treatment and comparison groups (Borg & Gall, 1989). The .05 level of significance was used to determine the effectiveness of the treatment. Data were analyzed using SAS System for Linear Models. The results are displayed in table and graph form as well as described in narrative in Chapter 4.

Ethical Safeguards

This study was not conducted until it had been approved by the Human Subjects Review Procedures for the School of Education, College of William and Mary and by the sample schools' district office.

Contact with the district superintendent was made after the School of Education approved the research. Once approved, the building principals were contacted to solicit their school's willingness to participate in the study.

A letter explaining the study and its potential benefit to the pupil was sent home to parents of all pupils who participated as subjects. The letter had a space at the bottom where the parent signed to signify approval of the pupil's participation in the research. The letter met all requirements of "informed consent" guidelines (Appendix C).

Individual data collected and results obtained were kept protected and confidential. Only group or masked data was disclosed.

Summary of Methodology

The purpose of the current study was to evaluate the effectiveness of a cognitive strategy designed to increase

composing skill in informative writing in elementary school children. The sample population was 121 students from five intact grade 5 classrooms attending two schools in a predominantly white, middle class school district in southeast Virginia.

Intact classes were assigned to the experimental or comparison group. To diminish the threats to internal validity inherent in the use of the nonequivalent control-group research design, analysis of covariance (ANCOVA) was used to analyze the data. One null hypothesis was tested at the .05 level to determine whether there was significant difference between the experimental and comparison groups on the dependent variable composing skill.

Chapter 4

Analysis of Results

The purpose of this study was to evaluate the effectiveness of cognitive strategy instruction designed to increase writing skill in elementary students. 121 subjects were assessed on one variable: composing skill.

A nonequivalent control-group research design was used to diminish threats to internal validity and data were examined using analysis of covariance (ANCOVA). For each measure the pretest score was used as the covariate, and the posttest score was the dependent variable. ANCOVA statistically reduces the effect of initial group differences by making compensating adjustments to the posttest means of the treatment and comparison groups. The .05 level of significance was applied to determine the effectiveness of the treatments.

The analysis of results for the hypothesis is as follows:

Null Hypothesis

There will be no significant difference in composing skill between the treatment and comparison groups as measured by domain scoring on students writing samples.

Results

75 students participated in the experimental treatment group. The treatment groups pre-test mean was 5.52 with a standard deviation of 1.26. The treatment groups posttest scores mean was 4.86 with a standard deviation of 1.07. The posttest mean, after being adjusted by ANCOVA for entering composing ability, was 4.49.

46 students participated in the comparison group treatment. The comparison groups pre-test mean was 4.42 with a standard deviation of 1.50. The comparison groups posttest score mean was 5.47 with a standard deviation of 1.55. The posttest mean, after being adjusted by ANCOVA for entering composing ability, was 5.67.

The results of the analysis of covariance are reported in Tables 4.1 through 4.4.

TABLE 4.1

Mean Number of Errors, Standard Deviations, and Adjusted Posttest Means on the composing score of writing samples for Treatment (n=46) and Comparison (n=75)

	Treatment Group		Comparison Group	
	Pre-test	Posttest	Pre-test	Posttest
N of Cases	75	75	46	46
Minimum*	3.00	3.00	2.00	3.00
Maximum*	8.00	7.50	8.00	8.00
Mean	5.52	4.86	4.42	5.47
SD	1.46	1.07	1.50	1.55
Adjusted Mean		4.50		5.67

** Minimum and Maximum refer to subjects score range on a possible scale score of 2-8*

TABLE 4.2

Analysis of Covariance Summary Table on Domain Scoring Posttest.

Source	Sum of Squares	DF	Mean-Square	F-Ratio	P
Pre-test	30.71	1	30.71	19.88	0.0001
Treatment	35.59	1	35.59	23.04	0.0001

TABLE 4.3

Pretest and Posttest Means by Treatment and School

Group		Trt	Sch	Pre Mean	Post Mean
Group A	(CPOI)	1	2	5.71	5.38
Group B,C	(CPOI)	1	1	5.31	4.33
Group D	(MWP)	2	1	4.64	5.68
Group E	(MWP)	2	2	4.21	5.25

TABLE 4.4

t Test for Posttest Means

Group		A(CPOI)	B,C(CPOI)	D(MWP)	E(MWP)
Sch 2 A	(CPOI)	------	0.002	0.446	0.734
Sch 1 B,C	(CPOI)	0.002	------	0.000	0.005
Sch 1 D	(MWP)	0.446	0.000	-----	0.259
Sch 2 E	(MWP)	0.734	0.005	0.259	-----

Analysis of Findings

There was a significant difference between the experimental and comparison group treatments ($F=23.04$, $df=1$, $p<0.0001$); therefore the null hypothesis was rejected. However, the difference was in a different direction than expected and the directional hypothesis was not supported.

Summary

One hypothesis was tested using analysis of covariance. For each measure the pretest score was used as the covariate, and the posttest score was the dependent variable.

Chapter 5

Summary, Conclusions, and Recommendations

Research in written composition is a relatively recent phenomenon. Prior to the mid 1970's, formal efforts toward teaching writing were limited to studying the mechanical aspects of writing. The Bay Area Writing Project and the National Writing Project, initiated in the early and mid 70's sought to advance writing by promoting what has become known as process writing. Although this approach has made valuable contributions toward improving students' writing skills, findings from The National Association of Educational Progress (NAEP) 1990 report, Writing Report Card, 1984-88, state that in the fourteen year span between 1974 and 1988, practically no gains were made in students' writing performance. In addition, recent reports suggest the process writing approach's impact may have been minimized because of the superficial manner in which the process strategies have been taught. Thus, many educators and researchers are beginning to ask if there are other instructional approaches, strategies, techniques or methods to improve students' writing. This study attempted to

evaluate the effectiveness of one cognitive strategy designed to increase writing skill in elementary school students.

The accessible population included 121 fifth grade student in five self-contained classrooms who attended two schools in a predominantly white, middle class school district in southeast Virginia. The sample for the current study consisted of 121 students whose parents gave permission for them to participate in the project. Intact classes were assigned to the treatment or comparison group. Students whose teachers volunteered to complete the training were assigned to the treatment group. The remainder of the students were assigned to the comparison group.

In addition to the treatment variable, the experimental group treatment contained a variety of motivating science related activities and specific components of instruction known to be effective in improving students' writing skills. In order to keep the experimental and control groups as nearly alike as possible except for the treatment variable, it was necessary to provide the control group with an alternative treatment containing the same instructional components and similar motivational activities. The resulting nonequivalent experimental comparison group design increased internal validity by reducing the threats of compensatory

rivalry, compensatory equalization, resentful demoralization, and experimental treatment diffusion. Data was examined using analysis of covariance to control for student's composing skill prior to the three week intervention.

Specifically, an answer to the following question was sought:

1. What are the differences in composing skills, as measured by domain scoring, between students using the composing strategy, Main Idea Paragraph Pattern, taught through the Cognitive Process of Instruction approach, and students taught through a modified writing process approach?

Null Hypothesis

There will be no significant difference in composing skill between the treatment and comparison groups as measured by domain scoring on students writing samples.

Conclusion

The null hypothesis was rejected. There was a significant difference in composing scores between the experimental and comparison groups in composing skill, but in a different direction than expected. There was an adjusted posttest mean difference of 1.18 between the experimental and comparison groups. The adjusted posttest mean scores for the experimental groups were lower than

those for the comparison groups.

Discussion

The findings from this study are perplexing in light of theoretical assumptions underlying the experimental treatment strategy and positive results of research studies in CPOI's application in areas other than writing. Nine alternative explanations are put forward and briefly explored in an attempt to interpret these results.

Alternative Explanations

Treatment infidelity. Treatment fidelity is defined as "the extent to which the treatment conditions, as implemented, conform to the researcher's specifications for the treatment" (Borg & Gall, 1990, p. 658). Careful training of those persons carrying out the experiment and delineation of precise procedures to be followed are two key ways to maximize treatment fidelity (Borg & Gall, 1989). Precautions were taken by the researcher concerning both of these considerations.

The researcher observed all groups at least twice a week during the three week intervention period. Observations and discussions with teachers after the observations indicated that both experimental and comparison group treatments were being executed appropriately. In addition, entries from journals kept by all

teachers indicated that experimental and comparison group teachers were comfortable with their level of knowledge of instruction and their execution of procedures. The researcher's notes on debriefing teachers at the end of the intervention period also point to a high degree of treatment fidelity. Thus, it is unlikely that treatment infidelity explains the results.

Test administration infidelity. Data in Tables 4.3 and 4.4 raise concerns regarding test administration fidelity. Data in Table 4.3 show that students in the comparison groups at both school sites scored lower on the pretest than experimental groups. Mean pretest scores for the comparison treatment groups was 4.3 and the mean score for the experimental treatment groups was 5.5 on an 8 point scale. Although the sample was composed of intact classes, students at school site 1 had been assigned randomly at the beginning of the year. Thus, one would expect there to be less of a discrepancy on pretest scores between experimental and comparison groups. This raises the possibility of intentional or unintentional bias on the part of the experimenters in administering directions for the pretest.

Additionally, data from Table 4.4 show the level of significance on the posttest between the experimental and comparison

treatments at school site 2 to be $p<0.734$. while the level of significance between the experimental and comparison groups at school site 1 is $p<0.0001$. Most of the variance between pretest and posttest means resulted from the experimental groups' scores at school site 1. While the pooled differences in pretest to posttest gains are significant in favor of the comparison groups, Table 4.3 and 4.4 data demonstrate the differences are unevenly distributed.

In a subsequent investigation, analysis of data available from 75% of students on their fourth and sixth grade Virginia Literacy Testing Program (VLTP) writing scores added credibility to the test administration infidelity alternative explanation. It was found that the mean composing scores of experimental treatment students from fourth grade (one prior to the experiment), fifth grade (experimental treatment pretest), and sixth grade (one year after the experiment) to be 5.8, 5.5, and 5.1 respectively. The mean composing scores for the comparison group treatment for the same tests were 5.3, 4.4, and 6.0.

Because the internal threat of treatment fidelity has been explored and judged unlikely as an alternative explanation and analysis of data from the subsequent investigation, test administration infidelity remains a viable alternative explanation.

Invalid instrumentation. Instrument validity or test validity means that the instrument used to collect data actually measures what it purports to measure (Borg & Gall, 1990). If the instrument is not valid results will be inconclusive and useless.

The scoring process used in this study is purported to measure composing skill through the assignment of ratings of identified criteria as demonstrated by the students. Scoring on all pre- and posttest writing samples was based on a holistic scoring scale of 1-4 and also on a domain scoring scale of 1-4. Although the papers were scored in five domains (composing, style, sentence formation, usage, and mechanics) only the composing score was used in this study. The operational definition of "composing" for this study and the scoring of pre- and posttests was: *the writer's ability to specify and focus on a central idea, to provide elaboration of the central idea, and to deliver the central idea and its elaboration through organized, unified, and coherent discourse.* Tests were scored by Data Recognition Corporation (DRC) under contract by the researcher. Information regarding validity is covered in detail in chapter 3. From nearly all appearances, validity requirements were met. Although sample length was not identified as a criterion, there appeared to be a relationship between sample length and composing

score. While Data Recognition Corporation has not conducted studies regarding length, DRC recommend studies write as much as possible in that the more students write, the greater the opportunity students have to demonstrate control over composing skill.

Effectiveness of CPOI approach. Results from the current study are in contrast to other findings regarding the application of the CPOI approach in reading and mathematics. Hopkins (1987) conducted a study to determine the effects of a CPOI-based instructional strategy on student skills in mastering and verbalizing the mathematics operation of rounding whole numbers, employing a posttest-only control group design. Students were fifth grade low achievers, ranging in age from ten to twelve years old. Posttest achievement scores of the students in the treatment group were significantly higher than those of the students in the control group who were taught with the traditional text book procedure. Further, there was a significant relationship among the students in the treatment group between mastery of rounding numbers and verbalizing the steps of the operation.

A second CPOI related study, conducted by Sherrod (1986), analyzed the effect of a fiction event schema to enhance students' ability to identify the main idea in passages they had previously

analyzed at an unsatisfactory level of performance. Sherrod used a one-group pretest-posttest case study design with 17 eight-to-eleven year old students. Results of the study indicated that after 15 hours of instruction in the use of the fiction event schema, students' identification of main ideas improved significantly.

While it must be pointed out that the CPOI experimental treatment in this study appeared to have had an overall deleterious effect on students' composing scores, disaggregation of data demonstrates that the CPOI treatment students' composing scores were strongly related to the number of paragraphs students wrote. For instance, students who wrote only one paragraph (27%) incurred the greatest decline with an average drop of 13%, followed by students who wrote two paragraphs (52%) with a decline in composing score of 11%, and finally students who wrote three paragraphs (21%) whose scores dropped only an average of 3%. Further analysis found that although students' composing skill scores dropped, these students nevertheless developed a more efficient use of words. The experimental treatment pretest correlation between number of words and composing skill score was .68 and the comparison pretest correlation was .72. However, the posttest correlation of number of words to composing skill score

was .65 for the experimental treatment and only .41 for the comparison treatment. Thus, it appears the experimental treatment maintained a greater efficiency in word use than the comparison group.

While the unpublished dissertations by Hopkins and Sherrod found evidence supporting the effectiveness for the CPOI approach in math and reading and this study identified a possible positive relationship between word usage and composing skill score, it must be pointed out that both Hopkins' and Sherrod's studies were weaker designs than the present dissertation and writing is a less well defined subject than either math or reading. In addition, overall composing skill scores did decline. Therefore, it must be concluded that the evidence regarding the effectiveness of the use of the CPOI approach to teaching informational writing is inconclusive.

Shift in discourse mode. Changes in discourse mode may affect students' compositions. There is considerable evidence to conclude that children's writing competence varies across discourse domains (narrative, expository, persuasive) (Scardamalia & Bereiter, 1986; Higgs, 1984). These two writers suggested that results may differ because children have a *closed* knowledge of narrative discourse schema and a fairly *open* discourse schema for informational and

persuasive writing. Schema are categorized as open or closed according to the extent social interaction (conversation) is necessary to facilitate their use. Students writing alone depend on closed schema. Therefore, it is logical that students are more proficient at writing narrative rather than expository text. Scardamalia and Bereiter (1986) state that most research on discourse schema knowledge in children has dealt with narrative, and such research confirms that children' tacit knowledge of narrative form guides their comprehension of stories. According to the authors, much less research has been conducted on children' use of expository and persuasive forms. However, Scardamalia and Bereiter caution that much of their own research indicates that although children are less proficient at writing in the expository and persuasive modes, children nevertheless are able to execute compositions that clearly demonstrate the features of these forms.

In light of the evidence which indicates that children are more proficient at writing in a narrative rather than expository mode, it is plausible to hypothesize that students would demonstrate less composing skill to the extent they shifted modes from narrative to expository on pretest and posttest writing samples. Further, while no constraints regarding response mode were placed on initial

writing samples, both experimental and comparison group students were encouraged to use the strategy they had learned to respond to the posttest prompt. Because the experimental and comparison groups emphasized different strategies and different approaches, it is possible that one group could have shifted from a narrative to expository mode more often than the other group, thus reducing posttest composing skill scores.

Additional analysis of the actual writing samples by the researcher determined that indeed there was a substantial shift of modes from narrative to expository. The writing mode shifted from an average of 95% narrative responses on the pretest sample to less than 10% narrative responses on the posttest sample. However, the mode change was evenly distributed among both experimental and comparison groups. The change in mode appears to be a function of either the prompt or the nature of the two treatments. Thus, the fourth rival explanation, shift in discourse mode from narrative to expository in writing samples, can be judged unlikely.

Cognitive overload constraints. The fifth rival explanation revolves around the concept of cognitive overload constraints and is related to the *composing as a recursive information processing* model advanced by Flower and Hayes (1980). Briefly, this model

posits that composing is divided into three main parts: *task environment* (immediate context such as school assignment); *writing process* (activities taking place in the writer's head); and the *writer's long term memory* (writer's knowledge of genre, etc.). Each of these three parts is further divided into subprocesses. A key feature of this model is that composing is *recursive* in that a writer shifts or jumps from one part or subprocess to another in a non-linear progression governed by the writer's *executive* control mechanism. Cognitive overload is a handicapping situation that occurs when excessive amounts of attention have to be devoted to one or more aspects of the composing process. For instance, Clay (1975) found that primary grade children demonstrate less effective writing because they often have to devote much attention to numerous transcription skills (forming and shaping letters, spelling, etc.) and have not yet automatized these prerequisite skills (op. cit. Scardamalia & Bereiter, 1986).

It is possible that the experimental group students experienced cognitive overload in that they learned a fairly involved writing strategy by means of a novel CPOI approach in a relatively short time frame. Within the three week time frame, students were introduced to the following CPOI strategies: the seven steps to CPOI;

Scanner Paragraph; Information Paragraph; Main Idea Paragraph; and Paragraph Writing Strategy. The comparison group treatment, on the other hand focused on and extended existing strategies through a familiar writing process approach. Two sources of information indicate cognitive overload may have occurred. First, the experimental group students' scores actually decreased. If scores had stayed the same, it could have been concluded that the experimental treatment investigated had no effect. However, the apparent reduction in composing skill scores indicates the experimental treatment did intervene in some way. Secondly, experimental treatment teachers' journal entries indicate students had some difficulty applying all strategies during the last week of the treatment. In addition, the experimental teachers' main recommendation during debriefing was to provide students a longer period of time to learn the CPOI strategies.

In an attempt to explain the findings, the researcher did further analysis and found the following:

1. The mean number of words per composition for the Experimental Groups pretest was 149 while the mean for the posttest was 136, a net average reduction of 14 words or a 10% decrease.

2. The net reduction in the mean number of words in the experimental groups was 10% and the net reduction in their composing skill score was 12%.
3. The mean number of words per composition for the Comparison Groups pretest was 98 while the mean for the posttest was 152, a net average gain of 54 words or a 55% increase.
4. The net gain in the mean number of words in the comparison groups was 55% and the net gain in their composing skill score was 24%.

Scardamalia and Bereiter (1988) state that "for experts and novices alike the greater part of effort in writing goes into generating content" (p.785). It follows then that such discrepancies in composition length between treatments indicates that overall the experimental treatment had a constraining effect and the comparison treatment had a facilitating effect on generating text.

Length of Treatment Time. The CPOI *Teaching Informative Writing Skills* (TIWS) program is intended to be used as an ongoing instructional strategy throughout the school year from grades 2 through 8. The current study was designed to test the CPOI approach in conjunction with the concept of representative design (Borg &Gall, 1989). The environment of the accessible population used in

this study called for the investigation to last three weeks and involve either a science or social studies unit. While Sherrod's study produced significant improvement in reading comprehension with 15 hours of instruction, it is possible this may not be an adequate time frame to test the complete effect of CPOI in writing instruction. Information presented in the cognitive overload section indicates this may be so.

Teacher performance differences. Joyce and Showers (1982, 1983) have repeatedly demonstrated the positive relationship between increased teacher performance and internalization or *automaticity* of newly acquired teaching skills. Further, studies by Showers (1982, 1983, 1984) showed that providing teachers with training in a new teaching behavior and allowing them to practice the new behavior increased knowledge level competency in up to 85% of the cases as well as ability to demonstrate the new skill competently in up to 80% of the cases. However, the same studies showed actual transfer of the new skill to the work setting (classroom) only occurred 15% of the time unless the teachers engaged in systematic ongoing coaching in the teacher's work setting. When this coaching dimension was added, the number of teachers who transferred competent performance into their

classrooms and continued use of the new skill increased from 15% to 80%.

Teachers in the comparison treatment group used a modified writing process approach. The modification amounted to incorporating a more focused use of student writing samples. Both comparison group teachers indicated that this modification would be easily accommodated into their current teaching pattern. All three teachers in the experimental group treatment reported confidence in use of the CPOI strategy and six observations by the researcher indicated the experimental treatment was being delivered appropriately. However, the three teachers in the experimental group treatment had to learn a completely new teaching behavior. In light of the finding by Joyce and Showers and Showers, the issue of teacher performance must be considered as an alternative explanation.

In fact, analysis of the research data suggest that a great deal of the variance may be attributed to what could be considered the teacher variable. When the overall results are disaggregated by treatment and school, the strong relationship between experimental and comparison treatment becomes weak and uneven. For instance, when pooled together the difference between the experimental and

comparison group means is 1.17 $p<0.0001$ in favor of the comparison treatment. However, the t test for posttest means indicates that most of the variance is accounted for at school site 1, that difference being 1.35 $p<0.0001$. The difference between experimental and comparison treatments at school site 2 is 0.13 $p<0.734$.

A related although somewhat different variable, amount of teaching experience, may also account for the unevenness of treatment results (see Figure 3.2 in Chapter 2 for teacher demographics). The two experimental treatment teachers, B and C, at school site 1 had 1 and 9 years of teaching experience respectively while the comparison teacher at the same site had 18 years of teaching experience. At school site 2, where the difference between the experimental treatment and comparison treatment was not significant, experimental treatment teacher A had 19 years of teaching experience while comparison treatment teacher E had 12 years of teaching experience. Thus, teacher performance difference, caused either by training limitations or amount of teaching experience, is also a viable alternative explanation.

Writer's motivation. The final alternative explanation arises from the experimental treatment teachers' journal entries and their

suggestions given during the end of treatment debriefing regarding future implementation of the CPOI strategy. While the experimental treatment teachers expressed enthusiasm for the CPOI approach, they noted that students became somewhat frustrated during the last week of the treatment with the increased application of the strategy. The experimental treatment teachers' most prevalent suggestion was to allow a longer period for students to move from mastering the strategy's pattern to applying it in ever increasing variations. Thus, it is possible that experimental treatment students simply wrote less because they had developed a negative attitude toward writing due to the frustration they encountered.

Implications

This study contains several important implications for the schema theory, the practice of teaching writing and future research.

Implications for Theory

The theoretical foundation of Fulton's CPOI strategy, discussed in chapter 2, is based on schema theory and makes several assumptions regarding the development of schemata. First, Fulton assumes that all students can learn to improve academic performance by developing schemata. Further, Fulton posits that academic disciplines are composed of subject content that has an underlying

structure which is organized from simple to complex. Fulton's third major assumption is that there are "base patterns", which underlie a discipline's structure, and which can be represented visually in the form of graphic organizers. Fourth, Fulton assumes that these graphic organizers or *learning visuals* can be employed as semantic mediators to help students develop a schema which guides the student in developing and demonstrating competence in performance of identified objects. Finally, Fulton assumes that students will internalize use of the schema to the point of automaticity by guided practice with examples of the objective and generation of examples in application and problem solving tasks (Fulton, personal communication, January 18, 1993).

In this study, the CPOI strategy was applied to informational writing through Fulton's *Teaching Informative Writing Skills* (TIWS) program. In this program the base pattern for the informational discourse mode of writing was the "Main Idea Paragraph Pattern". Although it was not part of this study's research question, analysis of the posttest writing samples reveals that indeed all students in the experimental treatment did master and apply the "Main Idea Paragraph Pattern" in the three week period. This finding offers support for schema theory and Fulton's assumptions regarding the

powerful use of visual mediators when used in conjunction with construction and application of tasks. Likewise, the positive results of the comparison treatment, to the extent they are valid, reinforce schema theory which predicts that it is easier to modify an existing schema than to establish a new one (Rumelhart & Ortony, 1977).

Implications for Practice

The results of this study suggest there may be a strong relationship between length of writing sample and composing skill score. The comparison groups, using a modified writing process approach, increased writing sample length by an average of 57% more words with a corresponding average increase in composing skill score of 24%. Incorporation of the strategies *models* and *scales* into the writing process approach appears to have had a facilitating effect on length and structure of comparison group writing samples. An implication to be drawn from the results of this study is that the best way to increase composing skill, especially in a short period, is to employ strategies, techniques and methods that build on the existing writing process approach, especially if they increase fluency.

Staff development personnel conducting training in the CPOI or teachers planning to use this approach should exercise caution in

implementing the program. Taking the results of this study at face value, it is suggested that teaching a completely new approach to informational writing appears to require time to learn the new strategy and additional time to gain facility, fluency, and flexibility in using the strategy. Whereas all experimental treatment group students demonstrated mastery of the Main Idea Paragraph Pattern, only 21% applied the strategy in its intended form. This suggests that a period longer than three weeks is necessary to allow students time to internalize the strategy so it can be utilized more fluently. Therefore, based on this study, it is important for those considering using the CPOI approach to be aware that a length of treatment longer than three weeks (15 hours) will be necessary for students to gain facility and fluency with use of the strategy.

Another note of caution to practitioners is warranted. The strong relationship in this study between length and composing skill score raises the possibility of instrument invalidity, one of this study's alternative explanations. Other studies (Scardamalia & Bereiter, 1986) suggest that increased length alone does not appreciably improve writing quality. The definition of composing skill employed as a criterion by the raters in this study does not mention length. But in fact, this study gives a strong indication that length plays a

significant role in determining students' composing skill score. Therefore, caution should be exercised in using only one method of scoring to assess composing skill.

However, if future research confirms a positive link between length of composition and composing skill, much consideration should be given to structuring classroom writing activities, exercises, and teaching strategies to provide an environment which encourages student to extend the length of their compositions. The use of student conferences, writing "think sheets" and other procedural facilitators would be a few of the many methods recommended to encourage and expand fluency.

Likewise, writing strategies, exercises, and activities which hinder or block writing fluency must be evaluated in light of their potential benefits versus their deleterious effects before being fully implemented. Additionally, consideration should be given to modifying strategies which have the effect of reducing fluency while maintaining other positive effects of the new strategy. For example, the CPOI approach to informational writing requires that students generate ten descriptive sentences and then reduce the number of sentences actually included in each paragraph to five. According to Scardamalia and Bereiter (1982) mature writers

typically generate far more content than they will use or intend to use in their compositions whereas it is difficult for young writers to produce content and ". . .young writers cannot imagine discarding anything that would fit enough" (opt. cit. Scardamalia, 1986, p. 785). Therefore, the CPOI approach could be modified to allow students to include more of their generated sentences in each paragraph.

Implications for Future Research

It is definitely desirable that more be learned about children's acquisition of writing skills. It is important to extend research on "writing strategies" to understand why they do or do not work. Future research needs to be conducted to determine the status and/or validity of this study's alternative explanations. For instance, the issue regarding instrument validity is crucial to a fair and equitable administration of barrier tests such as those of Virginia's Literacy Testing Program. If test length is a criterion that significantly impacts students' composing skill scores, then such information should be made known. Additional research that focuses on writing sample length and its correlation to the resulting domain score may discover that there is a threshold factor regarding writing sample length.

Research that assesses the potential for test administration

infidelity when conducting performance assessments would also be informative especially since there is currently a groundswell of support for authentic assessment tests. Much time and considerable precautions have been taken to develop procedures that guarantee standardized tests are administered unbiased. The potential for bias in authentic assessment is even greater due to the open-ended nature of the tests. A study could be designed that would provide several scripts that a test administer would enact after giving the direct instruction from the test prompt. One of the scripts could convey the message, "this test is not important so do not spend considerable time on it" while a second script would convey that the test is "somewhat important" and the third message would signal students that the test is "extremely important". Results from such a study would be instructive as well as interesting.

The CPOI *Teaching Informative Writing Skills* (TIWS) program is designed to have students learn a strategy which eventually has them writing multiple paragraphs and short reports. Several questions arise from this study's findings regarding the CPOI TIWS program and the relationship between number of paragraphs, composing skill scores and word efficiency. What would be the effect on students' scores if all CPOI treatment students wrote

three, four, five, or more paragraphs? Would composing skill scores continue to improve? If so, how long would it take for all students to develop mastery of the CPOI strategy to the point that fluency with its use was no longer a constraint? Is word use efficiency an important aspect of informational writing and if so, will the apparent correlational relationship hold true regardless of length? Would students continue to maintain a high rate of word use efficiency? What is the effect of the CPOI approach on students' attitudes? Future research could answer these questions and others.

A study designed to last nine or more weeks which included weekly sampling of student compositions could provide answers raised in the alternative explanations. Low, average, and high achieving students could be identified through standardized achievement data and included as variables to further determine how each category of students is affected by the CPOI approach. The research design could include trained test proctors who would administer the pre- and posttests to reduce the threat to test administration fidelity. Such a study might also incorporate an attitude survey to discover what effect, if any, the CPOI treatment has on students' attitudes about writing. In addition to providing data on alternative explanations of cognitive overload constraints,

length of treatment time, and effectiveness of the CPOI approach, this expanded study could help establish a "learning curve" for the CPOI strategy if one exists. Another suggestion for inclusion of future research studies would be the inclusion of more teachers and schools as well as other school divisions to reduce the teacher performance difference threat and to expand the external validity of the study.

In summary, this study found that, in the short run, it may be better to build on existing writing processes to gain increased composing skill rather than have students switch to alternative processes. Further research is necessary to investigate this study's alternative explanations and to address lingering questions regarding the impact CPOI has on informational writing.

APPENDIX A

Experimental Group Procedures

Pretest

All students will take a pretest. The teacher will read the directions and allow students the full hour to complete the assignment.

MATERIALS NEEDED

- Pretest Prompt
- Pretest Scoring paper

Day 1

The teacher will begin the first session with an activity "Memory Frameworks" which emphasizes the power of visual imaging when it is used to improve memory (See Tactics for Thinking, ASCD ...). At the end of the demonstration, the teacher will display the overhead transparency "Robert" (T1). Students are informed that Robert, age 7, was able to substantially improve his informative writing skills (as per the transparency) in just three weeks by using imaging and a new writing strategy. The teacher will then display the overhead transparency "Improvement Points Available" (T2) and give students an overview of the goals of the three week unit (To improve their composing skills in their writing by using imaging and this new strategy).

MATERIALS NEEDED

- Overhead transparency "Robert" (T1)
- Overhead transparency "Improvement Points Available (T2)

Day 2

The teacher will review the power of imaging and then introduce the first objective, "paragraph", using steps 1 and 2 of CPOI. In step 1, students interact with examples of the objective and sort these examples into a variety of categories (Training Manual page I-1). This activates students prior knowledge and engages them with specific

examples. The teacher completes step one by stating the specific objective to be learned and how it will be evaluated. In step 2, the students are introduced to the learning visual, "paragraph" (Training Manual pages I-2 and I-2a). The teacher uses the overhead transparency "Paragraph" (T3) to lead students through copying their own learning
visual (paragraph only) by:

1) Writing the paragraph on their own paper
2) Drawing a frame around the paragraph
3) Circling the thing, "Og"
4) Labeling Og, "THING"
5) Underlining each detail
6) Labeling the underlined sentences, "DETAILS".

MATERIALS NEEDED

- Training Manual (page I-1 pages I-2 and I-2a).
- Overhead transparency "Paragraph" (T3)
- 30 copies of the learning visual, "paragraph" (Training Manual page I-2a)

Day 3

The teacher introduces students to the visual learning mediator, "Scanner". Students are shown an overhead transparency "Scanner Poster" (T4) and told the Scanner will be used to help them describe the appearance of things (persons, animals or objects). Students are provided with a copy of the Scanner. They use this copy to trace their own scanner. The teacher uses the transparencies "Coverings" (T5, T6, and T7) to emphasize the outside coverings. The teacher also refers back to the transparency "Robert" in order for students to identify the correlation between Robert's sentences and the parts of the Scanner.

The teacher uses one of the large animal posters to practice using the scanner with the total group in large group instruction for the remainder of the class.

MATERIALS NEEDED

- One copy per student of the Scanner Poster (Training Manual,

page I- 4a)
- Overhead transparency "Scanner Poster (T4)
- Overhead transparencies "Coverings" (T5,T6,T7)

Day 4
The teacher reviews steps 1 and 2 and guides students through steps 3 and 4. In step 3 the teacher leads the students (step-by-step) through construction of two specific examples of paragraphs (Training Manual page I-5 with transparencies T8). In step 4 (Training Manual page I-6), the teacher guides students in abstracting the two distinguishing attributes of the objective, paragraph, by first having them compare how the two examples are alike and then how they are different. At this point, the teacher has used direct instruction with a high degree of teacher-student interaction and verbalization, to lead the whole group through constructing a concept of the objective, paragraph.

MATERIALS NEEDED
- Overhead transparency "Two Examples" (T8)

Day 5
The teacher reviews steps 1-4, focuses the students on their visual representation of the objective, paragraph, and provides a structured identification practice task (Training Manual page I-9 and transparency T9) and a structured construction practice task (Training Manual page I-9 and transparency T10).

MATERIALS NEEDED
- Overhead transparency "Identification Practice" (T9)
- Overhead transparency "Construction Practice" (T10)

Day 6
The teacher guides students in using the scanner to construct a paragraph on an animal. Students are then assigned an application task of writing a paragraph on a wild animal. They use the scanner as their strategy for selecting and organizing the information for the paragraph.

Students are given a "Wild Animals Coloring Pictures Set" and assigned to color them.

MATERIALS NEEDED

- Overhead transparency "Scanner" (T4)
- Endangered Species Posters
- 30 copies of Wild Animals Coloring Pictures Set

Day 7

The teacher first reviews the objective paragraph by having students take a short self-check review quiz (Quiz worksheet Level 1, I-13). The teacher uses "Mastery Assessment: Paragraph" (Training Manual page I-13; transparency T11) to review and check for correct responses.

Next, the teacher introduces the learning mediator poster, "Harold: Six Ways to Describe" as a strategy for gathering information for paragraphs. Emphasis is on using three of the six dimensions of description (appearance, behavior, and location) to write information paragraphs. At this point students have had five days of practice using the appearance dimension. The teacher completes the introduction of "Harold" by having students complete "Activity 1: Name the Dimension" (Training Manual page Harold-2; transparency T12) and "Activity 2: Identify the Dimension" (Training Manual page Harold-3; transparency T13).

MATERIALS NEEDED

- 30 Copies of Quiz Sheet Level 1, I-13
- Wild Animals Coloring Pictures Set
- Overhead transparency "Mastery Assessment" (T11)
- Harold Poster
- Overhead transparency "Activity 1" (T12)
- Overhead transparency "Activity 2" (T13)
- Overhead transparency "Activity 3" (T14)

Day 8

The teacher executes CPOI Step 1 (on the objective "Information Paragraph") by leading students in reading and then sorting six

information paragraphs (Training Manual page 1-1; transparency T15).

The teacher then executes CPOI Step 2. Students are show the learning visual "Information Paragraph" (T16). The teacher then guides students through copying and labeling the paragraph on Harold (Training Manual page 1-2; transparency T16). Emphasis is placed on the new, third part "Controlling Idea" and on how to look for an "Introductory Sentence".

Next, students are introduced to the visual representation for "Information Paragraph Pattern" and instructed to use this as a self-regulated check on information paragraphs. The teacher returns to transparency T15 and guides students in reading each paragraph again. At the end of reading each paragraph, the teacher leads students in identifying the attributes of the paragraphs using the visual pattern for information paragraph. The teacher guides the students in selecting those paragraphs that use "appearance" as the controlling idea dimension (Brachiosaurus, Bald Eagle, Gray Wolf, and Stegosaurus). At the end of this activity, students will have discovered the "controlling ideas" dimension of description, *appearance*, in each paragraph and its location in the information paragraph pattern. Students write "appearance" in the bubbled area identified as controlling idea on their copy of the visual information paragraph pattern. Students are told they will have a quiz on Monday. The quiz will require them to draw and label the Information paragraph Pattern learning visual. They will also be asked to recall the three questions which are criteria for the Introductory Sentence. This quiz will be a self check. Students will not be graded on the quiz. Therefore, their homework is to copy the visual five times. Each time they should practice visualizing the learning visual.

MATERIALS NEEDED

- 30 Copies of Student Worksheet Level 1, 1-1
- Harold Poster
- Overhead transparency T15
- Overhead transparency T16

- Homework Assignment - Information Paragraph Pattern

Day 9
The teacher begins the class with a quiz. Students are told to draw and label the frame for "Information Paragraph Pattern". They are also told to write the three questions which an Introductory Sentence might answer. The teacher uses transparency T17 to allow students to self check their drawings Next, the teacher reviews the objectives "Paragraph" (T3) and "Information Paragraph" (T16), the visual learning mediators "Scanner" (T4) and "Harold" (Poster), and the learning visual for the "Information Paragraph Pattern" (T17). For the remainder of this class session, students are assigned to cooperative teams (three to five per team). Each group will first select an animal and then write at least two sentences on each of the three dimensions of description (appearance, behavior, and location). They exchange their sentences with another team and guess which dimensions go with which sentences and then return the sentences to the originating team. An alternative activity is to have each group report out their sentences and let the whole group guess which dimension they are using.
MATERIALS NEEDED
- Endangered Species Posters
- Harold Poster
- Overhead transparency "Paragraph" (T3)
- Overhead transparency "Scanner" (T4)
- Overhead transparency "Information Paragraph" (T16)
- Overhead transparency "Information Paragraph Pattern " (T17)

Day 10
Students are introduced to the objective "Main Idea Paragraph Pattern" (T18) as compared with the objective "Information Paragraph Pattern" (T17). Students are told the addition of the main idea sentence is the difference. The teacher tells students, "The main idea sentence is *an important point about the dimension (controlling idea) in the paragraph.*" Previous

examples of information paragraphs (Student worksheet Level 1, 1-1) are used by the teacher to demonstrate how students should transform information paragraphs into main idea paragraphs. The teacher reads each paragraph and asks the question, "What is the dimension of description (controlling idea)? What is an important point to you about this dimension? Use your own words." Students write one sentence on their own paper. The teacher then asks individual students to share their sentences. The teacher emphasizes that the main idea sentences are all correct, even though they are different, as long as they are about the dimension. The teacher models using the main idea paragraph pattern (T18) as a visual self-regulating check-list to ensure all attributes (criterion) are present as the paragraphs (Worksheet Level 1, 1-1) are read.

MATERIALS NEEDED

- Overhead transparency "Information Paragraph Pattern" (T17)
- Overhead transparency "Main Idea Paragraph Pattern" (T18)
- 30 copies of student worksheet Level 1, 1-1

Day 11

Students work in cooperative groups to generate multiple examples of main idea paragraphs through practice tasks. Groups exchange assignments with each other and use the learning visual, main idea paragraph pattern, to check and critique the other groups' assignment.

Day 12

Students work in cooperative groups to complete an application task. Groups exchange assignments with each other and use the learning visual, main idea paragraph pattern, to check and critique the other groups' assignment.

Day 13

The teacher introduces the learning visual "Paragraph Writing Strategy and Information Finder Poster". Each student is given a copy and color

codes the three phases. Students work in cooperative groups to complete a practice task. Groups exchange assignments with each other and use the learning visual, main idea paragraph pattern, to check and critique the other groups assignment.

Day 14
Students work in cooperative groups to complete an application task using the Paragraph Writing Strategy and Information Finder Poster.
This task includes writing at least two paragraphs (each with a different controlling idea). Groups exchange assignments with each other and use the learning visual, main idea paragraph pattern, and Paragraph Writing Strategy and Information Finder Poster to check and critique the other groups' assignment.

Day 15
Students complete an application task individually. Students exchange assignments with each other and use the learning visual, main idea paragraph pattern, and Paragraph Writing Strategy and Information Finder Poster to check and critique each other's assignment.

On the first day following the completion of the treatments, all students will take a one hour posttest.

APPENDIX B

Orientation for comparison group treatment teachers toward the Environmental Mode of Instruction with Instructional Foci of Models and Use of Scales. Information excerpted from Research on Written Composition, Chapter 4: *Modes of Instruction*, and Chapter 6: *Criteria for Better Writing*, by George Hillocks, Jr. (1986).

MODE OF INSTRUCTION AND FOCI OF INSTRUCTION: Mode of Instruction refers to the role assumed by the classroom teacher, the kinds and order of activities present, and the specificity and clarity of objectives and learning tasks. Mode of instruction is contrasted with "focus of instruction", which refers to the dominant content of instruction, e.g., the study of model compositions, the use by students of structured feedback sheets, sentence combining, and so forth.

Environmental Mode

The environmental mode is characterized by (1) clear and specific objectives, e.g., to increase the use of specific detail and figurative language; (2) materials and problems selected to engage students with each other in specifiable processes important to some particular aspect of writing; and (3) activities, such as small-group problem-centered discussions, conducive to high levels of peer interaction concerning specific tasks. Teachers in this mode are

likely to minimize lecture and teacher-led discussion. Rather, they structure activities so that, while teachers may provide brief introductory lectures, students work on particular tasks in small groups before proceeding to similar tasks independently. Although principles are taught, they are not simply announced and illustrated. Rather, they are approached through concrete materials and problems, the working through of which illustrates the principle and engages students in its use.

Several assumptions underlie the environmental mode of instruction. One is that teaching can and should actively seek to develop identifiable skills in learners. A second is that these skills are developed by using them orally before using them in writing. A third assumption is that one major function of prewriting activity is to develop those skills. A fourth assumption is that the use of such skills (e.g., generating criteria to define a concept) is often complex and therefore may require collaboration with and feedback from others.

FOCUS OF INSTRUCTION: Focus of instruction include types of content or activities which teachers of composition expect to have a salutary effect on writing. These include the study of traditional grammar, work with mechanics, the study of model compositions to

identify features of good writing, sentence combining, inquiry, and free writing. These share the supposition that they precede writing and prepare for it or occur early in the writing process.

Models and Scales Foci

The study of model pieces of writing or discourse is one of the oldest tools in the writing teacher's repertoire, dating back to ancient Greek academies, which required that their students memorize orations. In today's composition curricula, use of models of excellence is still common. Usually, students are required to read and analyze these pieces of writing in order to recognize and then imitate their features.

Scales is defined as a set of criteria embodied in an actual scale or set of questions for application to pieces of writing. The use of scales engages students in applying the criteria and formulating possible revisions or ideas for revisions.

APPENDIX C

Dear Parents:

I am presently completing the doctoral program at the College of William and Mary. My program of studies has allowed me to develop expertise in curriculum and instruction, specifically instruction in writing.

I am working with the principal and a group of teachers in your child's school to assess and possibly modify the writing program. As a significant part of this process, I am interested in conducting a research project titled "The Impact of Cognitive Strategy Instruction on Students' Composing Skill". This study has been given administrative approval by _____, Director of _____. It involves utilizing fifth grade students to determine the effectiveness of specific writing strategies. This is where I need your help.

I would like permission to include your child in this study. As a member of the study, your child will receive intensive instruction in one of two writing strategies for approximately one hour per day for fifteen days. This instruction poses no physical or mental risk and is merely a modification of the current instructional program.

A writing test, similar to the Virginia State Literacy Writing test given to all fourth and sixth graders, will be used to measure the effectiveness of each strategy. Data from pretests and posttests will be collected. Although all consenting individuals will be tested, data will be recorded in such a manner that protects each student's identity. Individual records will be treated as confidential material and will be destroyed at the completion of the study. Any data published will be by group reports only.

I will be giving an overview of the study on _____ at _____ for those who want more information.

Please sign and return this form tomorrow (_____) or bring it to the meeting on _____. You may call me at _____ if you have additional questions.

Child's name: _____

Date of Consent: _____

Parent's Approval: _____

APPENDIX D

PRETEST PROMPT

Write about learning to do something by yourself. Use your planning time to think about what you will write. Remember a time when you learned to do something by yourself. It might have been when you learned to ride a bicycle, or to play a game. You might even remember when you learned to tie your shoe laces, or to zip up your jacket by yourself. Think about ways to tell what you learned to do and how you felt about it. Use your scratch paper to make notes or to list your ideas.

When you finish planning, begin writing your paper. The people who will read your paper are adults, like your teacher. Be sure to write so that these people will understand what you learned to do and how you felt about it.

When you finish writing, read your paper to be sure it makes sense. Be sure that you have used the best words to say what you want to say. Make all of the changes that you think will help your paper, and correct all the mistakes that you can find. Make your changes and corrections neatly so that your paper will be easy to read.

POSTTEST PROMPT

Write about having a machine that makes things disappear. Use your planning time to think about what you will write. Pretend that you have a machine that can make anything disappear. Think about what your machine would look like and what you would do with it. Maybe you would use your machine to do nice things for people. Your might use your machine to do funny things or even mean things. Think of ways to tell about having a machine that would make things disappear. Use your scratch paper to make notes or to list your ideas.

When you finish planning, begin writing your paper. The people who will read your paper are adults, like your teacher. Be sure to write so that these people will understand what you learned to do and how you felt about it.

When you finish writing, read your paper to be sure it makes sense. Be sure that you have used the best words to say what you want to say. Make all of the changes that you think will help your paper, and correct all the mistakes that you can find. Make your changes and corrections neatly so that your paper will be easy to read.

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